JOURNAL BPA OF THE

# Biological Photographic Association

Dedicated to the Science and Techniques
Pertaining to the Photography of All
Things Which Live or Which Have Lived

QUARTERLY OF THE BIOLOGICAL PHOTOGRAPHIC ASSOCIATION, INC.

Volume 21, Number 1 February 1953

# JOURNAL *of the* BIOLOGICAL PHOTOGRAPHIC ASSOCIATION



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OFFICIAL PUBLICATION OF THE BIOLOGICAL PHOTOGRAPHIC ASSOCIATION, INC.

Published at 733 North Van Buren Street, Milwaukee 2, Wisconsin. Editorial office: 533 West 57th Street, New York 19, N.Y. Entered at the Post Office, Milwaukee, Wisconsin, under the act of March 3, 1879. Subscription price $6.00 per volume; foreign $6.50. Single copies $1.50 in the U.S.A.; foreign $1.65 in U.S.A. funds.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# The Photography of Gross Specimens*

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ALL gross specimens are perishable and, no matter what attempts are made to preserve them, will eventually deteriorate. The photograph of a gross specimen preserves the original appearance and may be used for the record, for teaching, and for scientific illustration. Each specimen should be so handled that the best possible picture of it is obtained. Routinely, all gross specimens from surgical operations or from necropsies, particularly those having rare lesions or lesions of current interest, should be immersed in 10 percent formalin or Kaiserling I solution in spacious containers. In order that the specimen may retain its shape and anatomic relations, it must not be crowded. When it is a hollow viscus its content should be partly removed and replaced with the fixing fluid. Into solid organs like the liver, spleen, or consolidated lung, the fluid does not penetrate deeper than 2 cm below the surface. (Fig. 1) If a whole organ is to be preserved, the fixing fluid should be injected through the bile ducts, splenic vein, and main bronchus, respectively. Slabs of solid organs should not be thicker than 3 cm. A period of fixation — about 24 hours for surgical specimens, 2 to 6 days for necropsy specimens, and 3 weeks or over for brain specimens — should be allowed. The specimen should then be re-examined, the lesion carefully exposed on new smooth cut surfaces, and the excess tissue trimmed. After readying the specimen for photography it is immersed in 80 per cent ethyl alcohol until the color is restored, up to 30 minutes.

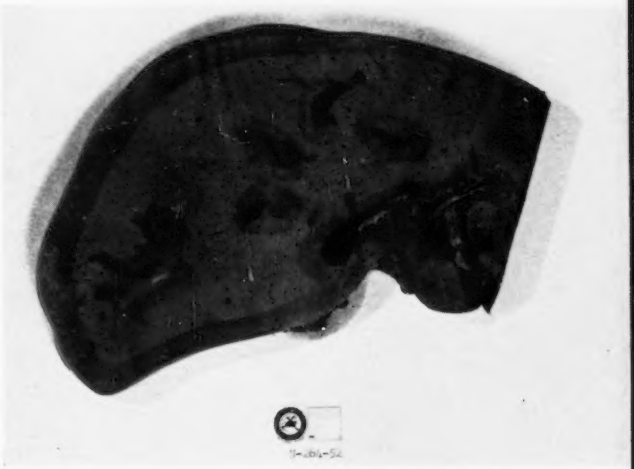

**Figure 1. Liver fixed in toto. Penetration of the fixing fluid is indicated along the surface and about the portal areas and branches of the hepatic veins.**

It is rarely desirable to photograph gross specimens in their fresh unprepared state. Due to the effect of oxygen on the red blood cells such specimens acquire an unnatural hue. The color photograph is gaudy, and the black and white print will reveal distorted, bulging, and curved surfaces. Conversely, the fixed specimen has definite contours, smooth surfaces,

*Received for publication December 10, 1952.

clearcut edges, and the black and white picture of it will be sharp and concise (Figs. 2, 3, 4, and 5). The fixing fluid also hardens the specimen and preserves its shape. Surfaces, when cut, do not bulge and the pattern of the lesion and its demarcation from the uninvolved parts are clearly revealed. Trimming of gross specimens requires a long sharp knife, skill, experience, intimate knowledge of anatomy, and an eye for appearance.

White light includes all the colors of the visible spectrum. It is the natural light for viewing any specimen. When a colored background is introduced the colored surround may give a false color to the object. Assuming a somewhat spherical shape for the object some light will be reflected at the critical angle, and hence being colored light of a higher intensity than diffuse reflected light, it will distort a photograph in color to a remarkable degree. For example the edges of a red object can be made to photograph green. The background therefore should be neutral: white, black, or gray.

Shadow is a natural effective delineator of depth and configuration. Photographing the specimen on glass over transmitted light and hence eliminating background shadow deprives the picture of natural adjuvants of perspective, sharpness and delineation. The photograph should be a true reproduction of the subject avoiding distorted perspective or proportion. Ordinarily, placing the lens at a right angle to the subject will accomplish this objective. An angle approach may occasionally be necessary to penetrate distance or to reveal surfaces at right angles to one another (Fig. 2). In orienting the specimen, particular attention should be paid to its appearance, its environs, and its identification. This includes the institution seal, number of the specimen, and a centimeter scale as a measure of magnification.

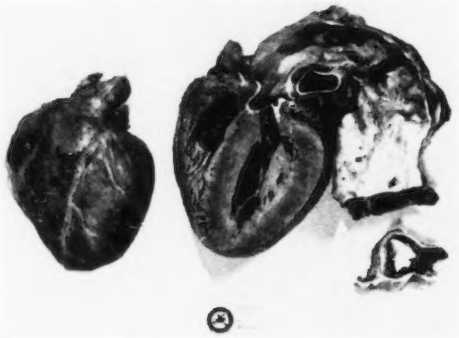

Figure 2. Heart and aorta photographed on a white background at an oblique angle to bring out details of depth. The natural light gives a subtle shadow that produces the third dimension. A frontal cut divides the heart with the external and cut surfaces visible. Rounding of the apex, thickening and scarring of the myocardium, and a dissecting aneurysm of the aorta are noted. There is a tear on the intimal surface and clotted blood extends between the split layers of the aorta (male aged 58 years).

The improved lenses, films, and techniques of modern photography permit excellent reproduction of the form and color of gross specimens. It is assumed that the photographer uses proper lighting and exposure to obtain technically the best picture with the equipment at his disposal. It is also assumed that the most suitable films and chemicals are used for the developing and appropriate paper for the printing. All this, however, makes only for the technical excellence; the picture, above all, must have content and this is where the partnership between art and science begins. There should be awareness for attractiveness of the environs and for artistic appearance of the specimen. To be a worthy photograph the specimen must reveal its content with the least possible distraction from the lesion being illustrated (Figs. 2, 3, 4, and 5).

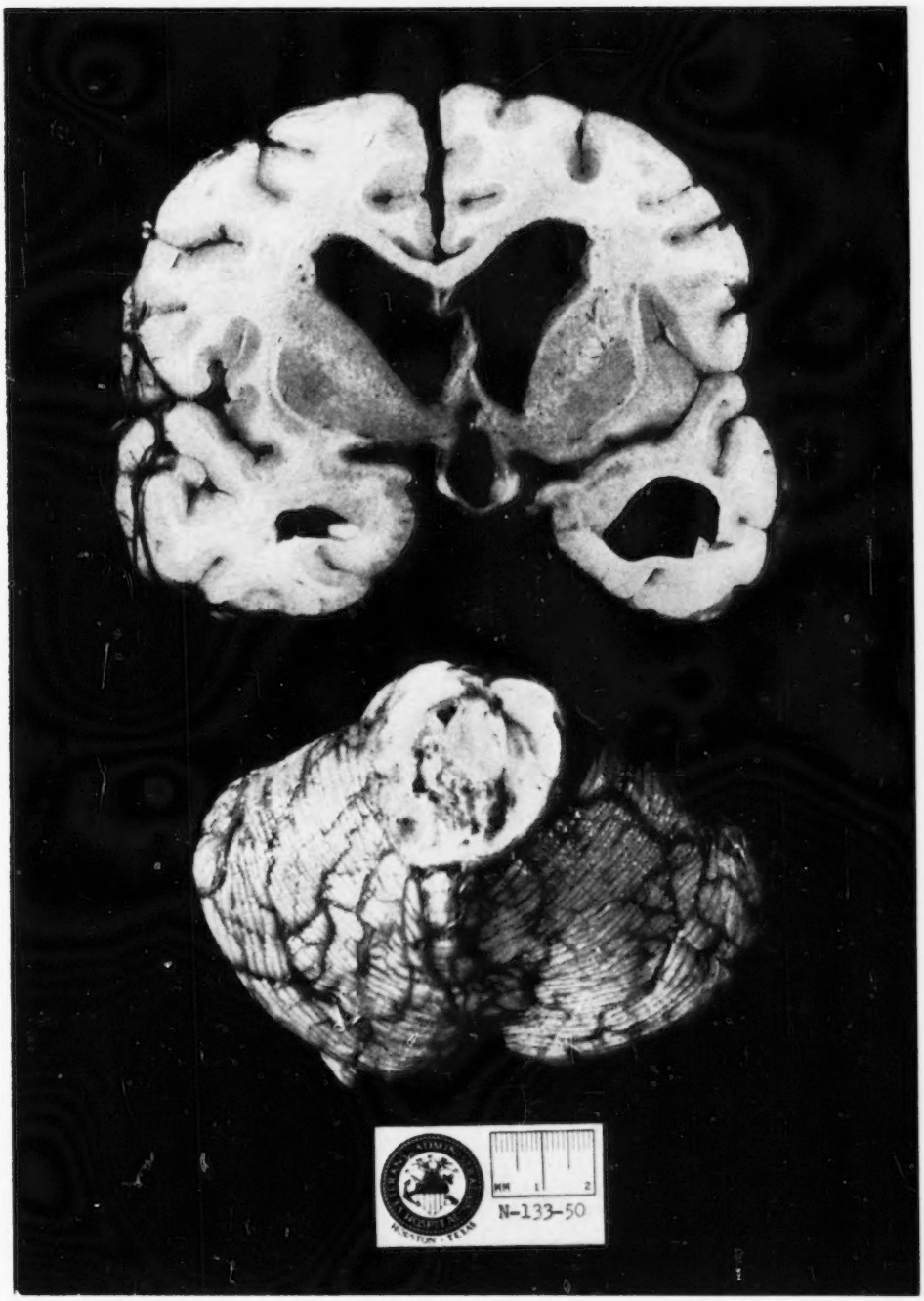


Figure 4. Brain photographed on a black background to contrast the predominately light tones. The sagittal cut surfaces of the cerebral hemispheres disclose symmetrical dilatation of the lateral and third ventricles. The cut surfaces of the midbrain just anterior to the pons reveal the cause of the dilatation: obstruction of the aqueduct of Sylvius by a neoplasm, gliobastoma multiforme, of the brain stem (male aged 25 years).

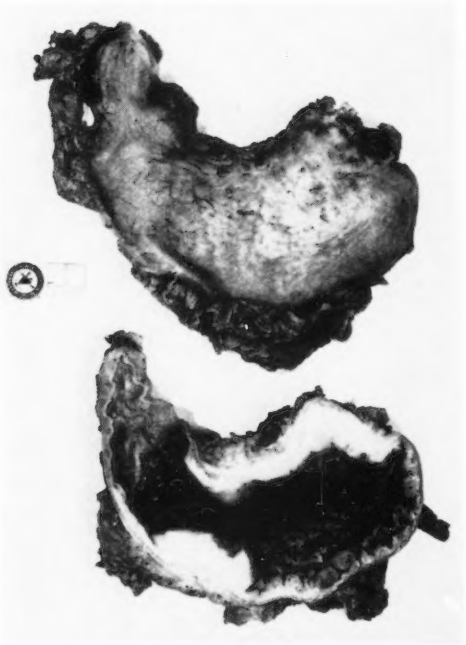

Figure 3. Stomach removed surgically (male aged 56 years). The fixed specimen opened by a frontal cut reveals the contours of the lesion on the anterior surface and on the cut surface. The carcinoma of the stomach involves the lesser curvature and extends over the anterior surface. The cut surface exposes the thickening and destruction of the pattern of the wall and the transition to uninvolved areas.

There is an optimum time for the gross specimen to be photographed and the photographer should be available at that time. The best time for photographing the specimens is during the weekly conference when the gross specimens of the necropsies performed during the week are reviewed. Surgical specimens are photographed at the same time. Examination of the fixed encephalons should also be made at a given time, perhaps on alternate weeks at the Neuropathologic Conference held with the services concerned. By coordinating efforts in this manner, time is saved and excellent

Figure 5. Rectum removed surgically (male aged 57 years) photographed on a white background. The contours are rounded, the edges are sharp, and there is no distortion. The shadows accentuate the third dimension. About 9 cm from the anal opening there is a narrowing of the lumen by a neoplastic growth, carcinoma, columnar cell, causing thickening and destruction of the usual pattern of the wall that can be seen clearly above and below the area of involvement.

photographs of gross specimens are obtained.

Interest in the photographic results may be sustained by a weekly review of the photographs taken. At this time the best of them may be selected and exhibited in a frame. The color slides may be exhibited in a lighted box. During the selection, ideas are exchanged and modifications are agreed upon to improve the methods in operation.

## Summary

Each specimen should be so handled that the best possible picture of it is obtained. It is rarely desirable to photograph gross specimens in their fresh unprepared state. Appropriate fixing fluid hardens the specimen and preserves its shape so that freshly made cut surfaces do not bulge and reveal clearly the pattern of the lesion and its demarcation from the uninvolved parts. Color may be restored by immersing the fixed specimen in 80 per cent ethyl alcohol. There is an optimum time for the specimens to be photographed and the picture should be taken at that time.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# Photography in a Food Research Laboratory*

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## Introduction

PHOTOGRAPHY as used in food research is far reaching and varied. It is employed not only for the purpose of making pictures of luscious steaks, bacon, butter, eggs, and cheese, but also for the purpose of studying these products from farm to table.

Photographs are used to draw comparisons. The human mind cannot retain every detail about the appearance of a subject, even from one hour to the next. The photographic film, on the other hand, forms a permanent record for handy and accurate reference. Thus, judges can look at a group of dressed chickens and say after comparison with a few well-made photographs, "These chickens are fatter and better fleshed than those of last year".

Using poultry as an example, we can examine how photography is used in a food research laboratory to record and study foods throughout their history. How does a chick develop? How much does it grow? How does it look microscopically? How will it look on the table? Photography can aid in answering such questions.

## Photography at the Hatchery

A hatchery must keep its incubators running at top efficiency. If failure occurs, it is essential to know at what time during the incubation period the interruption happened, so that the trouble can be corrected and prevented from recurring. To help the inspecting hatchery-

Figure 1. Fresh Unincubated Egg

*Received for publication, October 25, 1952.

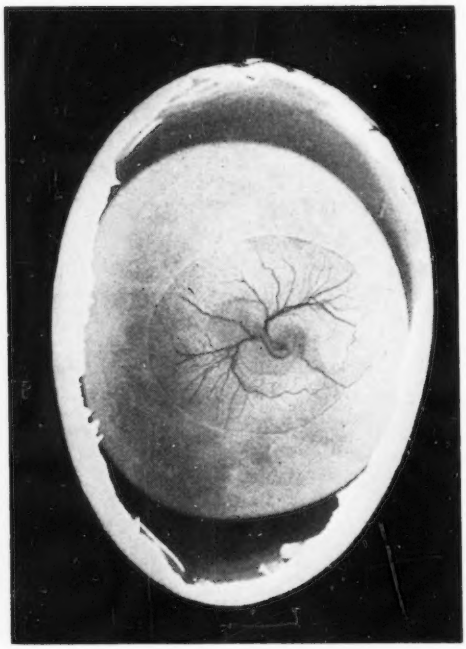

Figure 2. After 3 Days of Incubation

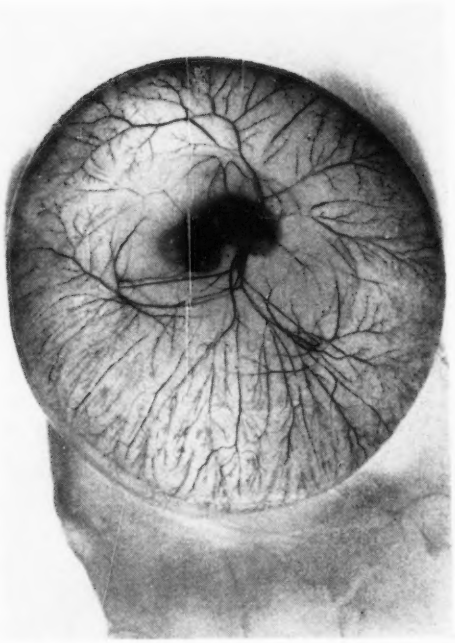

Figure 3. After 6 days of Incubation

man determine accurately the cause of the trouble, a set of color slides is used to show the day-to-day development of the chick embryo.

Figure 1 shows the fresh egg before incubation. The shell has been cracked away to show the blastoderm on the yolk.

During the first day of incubation the area pellucida and the area opaca can be seen. The head which has formed is barely discernible without greater magnification.

On the second day blood vessels are clearly defined and the heart has started to form.

In the third day the limb buds form and more blood vessels are evident. (Fig. 2) At this stage the heart manifests pulsations when observed in the specimen.

After the fifth day, the eyes are very readily discernible. The head is large and the blood vessels are more profuse and pronounced. At this stage the embryonic area has almost entirely covered the surface of the yolk and is so large that the contents of the shell had to be eased into a petri-dish.

It might be well to point out here the importance of specimen preparation. Great difficulty was encountered in getting the embryo from the shell to the petri dish. The embryos were alive and if one of the small blood vessels were broken, the beating heart caused blood to flow on the specimen. Consequently, enough of the shell had to be removed and a sufficient amount of underlying membrane left so that the sharp edges of the shell would not cut the vessels. It was not always possible to place the embryo in the most advantageous position. Any attempt at positioning resulted in either breakage of the yolk or rupture of blood vessels.

The specimen had to be kept moist with a solution of 50% glycerine and 50% water so that the translucent effect shown here could be achieved. Highlights and shadows were eliminated as much as possible by placement of lights and by tilting the dish slightly one way or the other.

By the sixth day, limb segments are observable. (Fig. 3) All structures, especially the head have become much more pronounced and adult-like and on the seventh day the beak becomes visible.

The major blood vessels, the limb buds and the eye enlarge until by the tenth day the contour of the bird has become very much adult-like. (Fig. 4) The eye seems smaller in relation to the head; the beak a little larger.

While the external structure does not change except for enlargement, the internal structure is continuing to be formed and made functional until on the thirteenth day the down becomes visible and the limbs are more mature.

On the fourteenth day scales and claws are forming on the feet. The feathering continues; the eyes, on the fifteenth day, rather than being one big black spot, can now be seen to have some form. (Fig. 5) The beak is larger and yolk has become smaller in relationship to the embryo.

Scales, beak and claws are horny and the egg white is all used up by the sixteenth day. The amniotic fluid begins to decrease. There are only four days left before the incubation time is over and it is clearly evident that all processes are moving quickly toward preparation of the embryo for life outside the shell.

The amniotic fluid continues to decrease. At the same time, the feathers, beak, eyes, spurs and claws are very pro-

Figure 4. After 10 Days of Incubation

Figure 5. After 15 Days of Incubation

Figure 6. Chick Just Prior to Hatching

nounced. The yolk sac enters the body cavity until on the twentieth day the air cell is pipped and much last minute preparation for emergence is made (Fig. 6). On the twenty-first day the shell is pipped and the chick breaks into the outer world ready for further growth and development.

The composite picture on which successive stages of the development of only the embryo are shown is Figure 7. The yolk, white and blood vessels have been removed to avoid confusion. The hatcherymen use this collection as a guide for examining the eggs which have not hatched to determine the day of mortality.

Now that the chick is out of the shell, growing and maturing are its next tasks. Many factors influence growth, one of which is feeding. It is essential therefore to know as much as possible about the effect of diet on the growth of animals.

Using photographs, growth comparisons can be shown graphically. A three-inch grid is used as background for the live chickens.

In addition to growth and feeding studies, effects of other factors on chickens can be readily recorded by use of photography. A peculiar feathering or abnormal body conformation may be more easily distinguished from the normal ones if photographs are available.

## Photomicrography of Muscle Tissue

Tenderness of meat is an immense factor in the salability of a product and since histology is one of the ways of learning about tenderness it is frequently used. By this, together with other means, it has been found that a muscle in rigor is very tough and does not become tender until post-rigor relaxation takes place. Photomicrographs are often used to study and compare muscles and organs of animals.

The muscle shown in Figure 8 was taken from the bird immediately after it was dispatched and handled by routine histological methods. Rigor mortis which appears very soon after death has not yet set in and the fibers are very straight. Notice the wavy appearance which characterizes muscles in rigor (Fig. 9). When muscles showing rigor were measured on a tenderness tester, they invariably were tougher than in post-rigor relaxation (Fig. 10). The fibers have straightened again and some have broken.

## Conclusion

While the illustrations presented refer only to one product — *poultry* — other

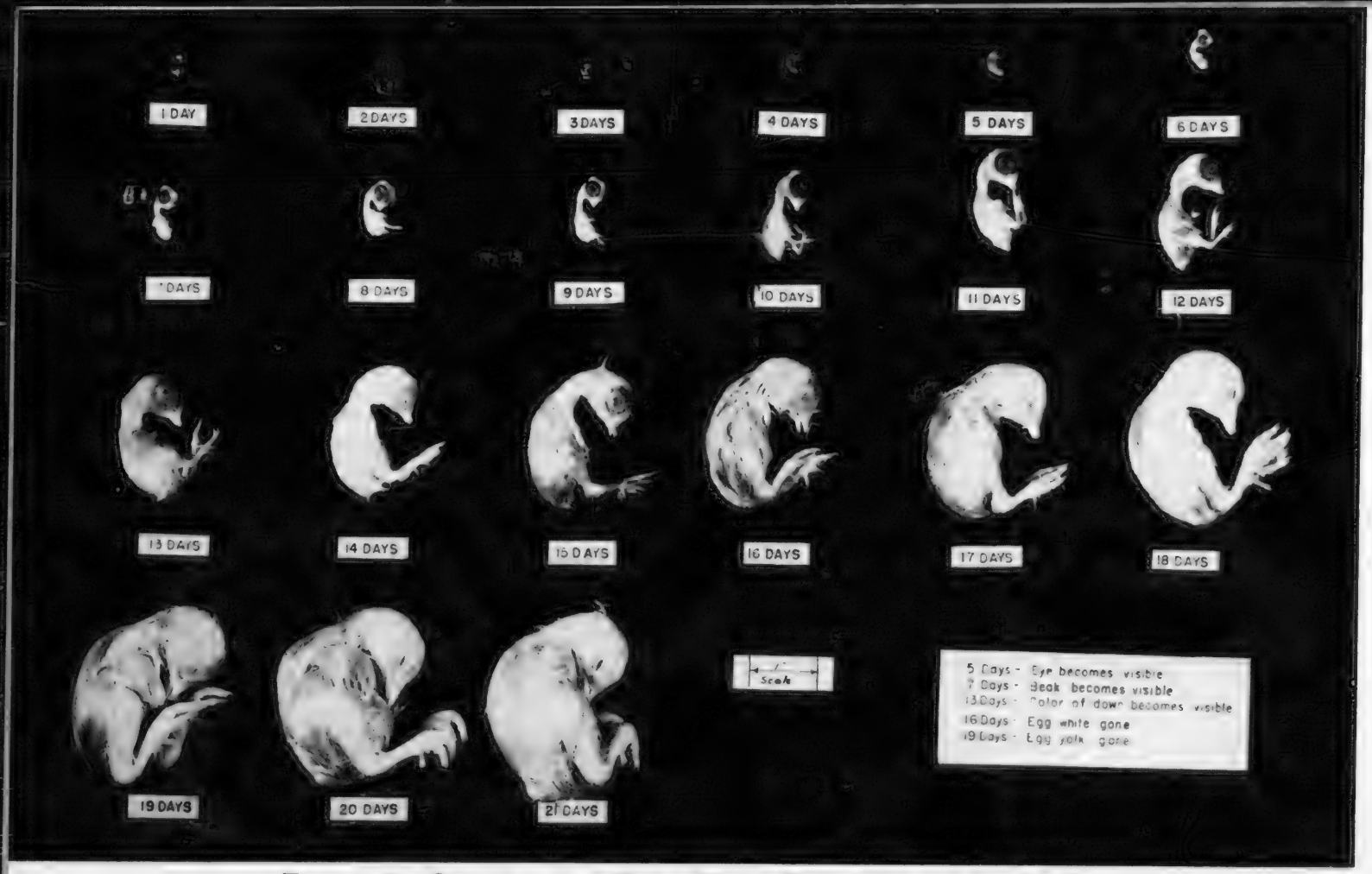


Figure 7. Composite of Baby Chick Development in the Egg

(Membranes removed except in the 1, 2 and 3 day embryos.)

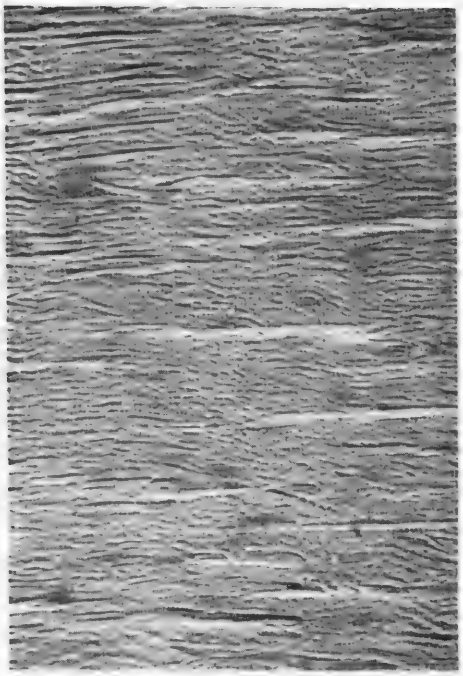

Figure 8. Chicken Muscle Before Rigor

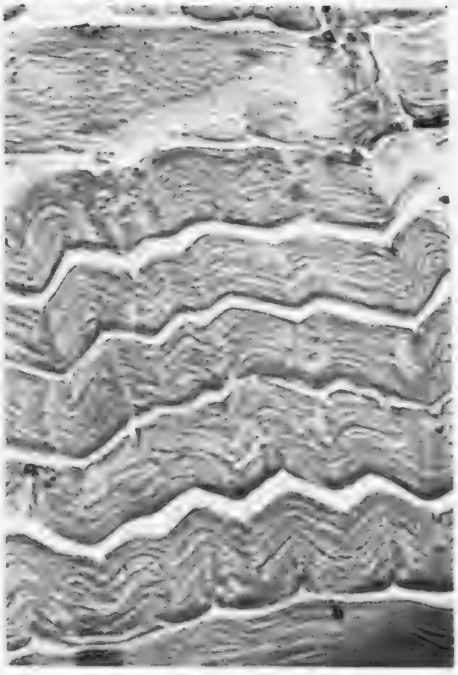

Figure 9. Chicken Muscle in Rigor

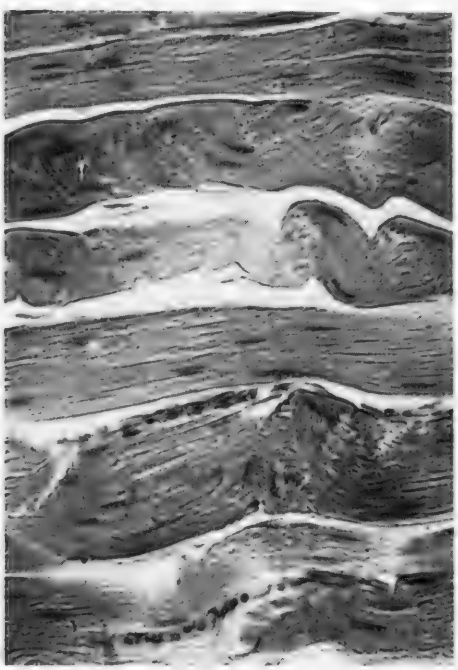

Figure 10. Muscle in Post-Rigor Relaxation

food products such as beef, lamb, veal, ice cream, as well as by-products such as skins and hides, soap and glue all benefit from the use of photography in maintaining quality.

A food research laboratory photographer has a varied field, not only as to subject matter but also as to the facets of photography. Virtually every kind of photography is useful. Photography in black and white, color, infrared, and ultraviolet used skillfully can many times show phenomena that could not be demonstrated by other laboratory means. The photographer by way of photomicrographs, copies, and studio work, is highly important. Through him research progress is graphically recorded as no other procedure can. Specialized equipment is sometimes demanded, in which case the photographer works in collaboration with the research scientist and engineer.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# Microfilming of Radiographs*

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## Introduction

THE past few years has witnessed the growing idea that size reduction (minification) of radiographs would be a desirable procedure. The vast accumulations of radiographs have imposed storage burdens on medical offices and hospitals, and has in turn directed the attention of those concerned to the high cost involved.

The accelerated use of radiological examinations calls for serious consideration to the even greater storage problem of the future. These problems exist because the medical profession, especially the radiologist, traditionally has opposed the destruction of radiographs. This custom is based on a professional interest in patients as well as on professional security. Since courts of law have ruled that radiographs are the property of the physician, there is a further implied responsibility.

Radiograph Micro-File Machine
Kodak Model I

* Presented at the 22nd Annual Meeting, New York City, 1952. Received for publication, September 12, 1952.

### Early Efforts

Minification of radiographs has been practiced since the inception of radiography. The making of a lantern slide is essentially that. But it is a laborious and somewhat costly procedure if applied to thousands of radiographs. With advances in sensitive materials and optical equipment, so-called documentary microfilming became an accepted practice in business and commercial fields. It was logical to consider applying these principles to copying radiographs. These early efforts did achieve some success, but not complete acceptance.

With radiographs, density ranges extending from the clear areas to values of 2.5 to 3.0 must be copied. The geometric pattern of these densities, the contrast existing between them, the scale of a localized density gradient, and the detail of anatomical and pathological manifestations are the elements a diagnostician has to integrate for interpretation.

It is of prime importance that any microfilm copy should retain these attributes of the original. The early work in radiographic microfilming did not achieve this. Essentially, the microfilms were of too high contrast and also deficient in resolving power. But where the urgency of storage demands existed, it was deemed prudent to accept the lesser of two evils, the loss of diagnostic quality. These early operations used a two-film, negative-positive method.

### Direct Positive Method

Later on another process was introduced in which equipment was designed to use direct positive film. This method has certain merits and has found a place in the field of radiographic copying. However, it must be pointed out that direct positive film tends to produce a copy having increased contrast, and the critical reproduction standards are not satisfied. Also, these "final" copies of the radiographs are not amenable to any further form of satisfactory duplication. These limitations are not reconcilable to the needs of a complete microfilming system.

### Requirements of Ideal System

From a well founded knowledge of radiological practices and a study of these needs, it became evident that any acceptable system should meet the following requirements:

(1) The microfilm intermediate should resolve the detail and preserve in a relative scale the densities of the original radiograph.

(2) The original range of densities and the detail should be re-established in the positive 35mm print.

(3) Any number of copies of a given film should be producible.

(4) Any size lantern slide, paper duplicate, or a film duplicate of the original radiograph ought to be available.

(5) Equipment, material and labor costs must be economically justified.

These requirements lead to the conclusion that a negative-positive method should be employed. Also, to microfilm millions of radiographs at a reasonable cost, the operations should be fast and as automatic as possible using photographically unskilled personnel.

### Equipment, Materials and Advantages

It was these concepts that led the Eastman Kodak Company to the design of the Kodak Radiograph Micro-File Machine, Model 1, the production of a

suitable intermediate film, namely Kodak Micro-File Film, Type X, and the selection of Eastman Fine Grain Release Positive Film as the complementary duplicate material or printing film. For a detailed description of these products refer to the manufacturer's announcements and an article in *Medical Radiography and Photography, Vol. 27, No. 4 (1951)*.

The key to the whole situation was the negative film. It was believed if a film were made which could record the detail, range and gradations of radiographs without dodging or masking, then optical and mechanical equipment could be built to use such a film effectively. Eventually this extremely fine-grain, long scale, low gamma, panchromatic film was provided. It was possible then to microfilm radiographs simply by placing them on an illuminated surface and pushing a button.

The resulting apparatus has a fixed lens aperture, a constant exposure time and the illumination is maintained at a predetermined level by air cooling the fluorescent lamps and by utilizing a variable voltage control. No photographic skill or judgment is needed by the operator and since the complete exposure and film transport cycle is slightly less than one second, it can be easily understood how it is possible to copy at the rate of 800 to 1000 exposures per hour, including both films and identifying envelopes, when the films are removed from their envelopes and brought to the side of the machine.

This two-film system has other advantages. There is the matter of security. After the first positive contact prints have been made from the intermediate rolls, the latter can be stored in a violence-proof safe or room. Since any number of prints can be made from these intermediate rolls, it is easy to replace lost or damaged copies. Another most important advantage is the practicality of making full size facsimiles of microfilmed radiographs by enlargement onto Kodak Industrial X-ray Film, Type A. Lantern slides also can be made by binding a frame of the positive film between glass slides, or by projection printing of the images onto 2 in. x 2 in. or 3¼ in. x 4 in. lantern slides. Teaching, pathological, and other groupings can be composed and in any number of sets.

The merit of the whole system is demonstrated by these original size reproductions, some of which are so like the original it is difficult to select one from the other. This gives a security to the microfilming program. If the radiologist knows that should an urgent need arise for reference to the information of an original film which has been destroyed, it can be provided with such faithful duplicates, then one of the most serious objections to microfilming is removed.

This negative-positive duplicating procedure yields such good results partly because the microfilm images are made as large as possible on the film. The radiographs are copied with the long axis of 14 x 17-inch radiographs parallel to the length of the microfilm. And with no perforations makes almost the complete width of the film utilizable. This gives an image about two times the size of those made with the orientation of the radiographs across the width of the microfilm.

**Cost Considerations**

The cost of microfilming, even using the two film method, is remarkably low. The 100-foot roll of negative film lists

at $6.59 and the commercial processors charge about $2.00 to process it. They also charge about $6.00 for making a positive print of the roll. Without labor, this averages about $.017 per radiograph or envelope, figuring on the basis that each roll film will hold images of 850 radiographs and envelopes. If microfilms of older radiographs are retained only as negatives, the cost is less than one cent per film. The salvage value of discarded radiographs and envelopes can be figured against these costs.

The labor cost will vary. One person can copy 800 to 1000 films per hour if the films and envelopes are properly stacked at the machine and in turn removed after copying. The labor then should be estimated for two people, since the work of one will just about keep pace with the other. If one person does both operations, the rate will be slightly less than one-half the above estimate.

The apparatus mentioned in this paper has a list of $2,650.00. Its amortization will be defined by the fiscal practices of the purchaser. If charged directly against the project in terms of numbers of films copied this cost factor per film will be determined by the number of films to be copied, not only those of the past but also those of the future. However, there is another way of balancing this cost.

As long as radiographs are retained they occupy space. This space is valuable, whether it is a rented office area, or within owned premises. It is common knowledge that most hospitals today are in urgent need of more space, both for patients use and for functional facilities. Space recovered by microfilming, if considered in terms of capital investment, will repay many times the cost of the equipment. In rented space, the marked reduction in rent could justify the investment in microfilming apparatus.

## Conclusion

In conclusion, a few words about viewing radiographic microfilms is in order. It can be said empirically that all the present known viewing devices do not do justice to the high quality of the microfilms. Ground glass screen images suffer impairment of detail and often lack illumination uniformity. Devices projecting the image onto opaque screens do not give enough reflected image brightness, and instruments in which images are transilluminated suffer from low magnification. However, it is known that efforts are being directed to the solution of this problem. One promising means is the use of a junior size binocular microscope fitted with 10X eye pieces. With such a device, the viewed image is almost original radiographic size, is free from distortions, and the films can be illuminated strongly enough to pass light through all the microfilm densities.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# X-ray Copying Without Guesswork*

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VARIOUS discussions of methods or techniques have arisen from time to time concerning the utilization of the brightness range principle of making negatives and subsequent prints and lantern slides. Unfortunately, many of us regard the subject of brightness range as we would nuclear fission. Such a thing exists, we have been told, however, its name alone exerts a certain repulsive force which tends to drive from our minds all desire to investigate or utilize something which may prove beneficial to us. Brightness range is a tool which, if properly used, will minimize the resultant mental anguish and magnify the overall quality of just about any black and white assignment which may present itself to today's medical photographer. A method which utilizes brightness range in theory but which is presented from the practical viewpoint only is suggested for use by those of you who are not fully satisfied with the quality of your everyday X-ray copies.

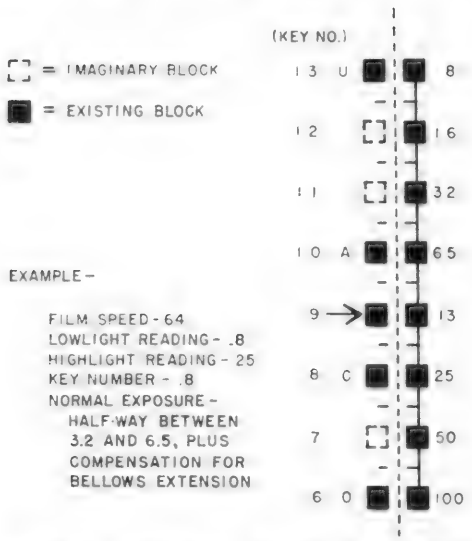
Very rarely are two radiographs alike. The density and contrast differences of each necessitate individual treatment during the process of reproduction as prints or lantern slides. Although certain standardized or guesswork methods of copying X-rays have been suggested and are employed by photographers in the medical field, the mere grouping of a dozen or so films into visual classifications such as flat, medium and contrasty and then going ahead with other standardized or guesswork methods of group exposure and group development is not conducive to qualitative results.

Many hours of experimentation with many dozens of X-rays of various degrees of goodness and badness have substantiated a three-step method whereby use is made of the *Weston Master Exposure Meter* to record brightness range and thereby produce radiographic copies which are above mediocrity. Any professional type exposure meter may be employed in the method. Once the procedure is familiar, the basis for calculations may be adapted to the *General Electric Exposure Meter* or to others of equal or greater sensitivity. A thin strip of metal, about one-half inch in width, bent to conform to the depression of the photoelectric cell of the *Weston* meter, and painted matte black, will enable more selective readings to be made if inserted over the cell with the cell cover in the open position. If such a "hood" is utilized, it is recommended that the film speed of the negative material in use be reduced one-third to one-half from that suggested in Step I.

### *Step I*

Using the rated tungsten film speed, e.g., 64 for *Kodak Ortho* X, and with all lights of the X-ray illuminator in the

*Received for publication, September 25, 1952.




**Schematic diagram of portions of the inner and outer dial of the *Weston Master Meter* showing the positions of the key numbers as assigned to existing and imaginary blocks of the inner dial.**

"on" position, place the meter in direct contact with the radiograph and take readings of both the *highlight* and *lowlight* areas of the film in which you are desirous to record detail on the finished print or lantern slide. Place the normal arrow of the *Weston* meter half-way between the two readings. This represents the basic exposure to be used for the particular X-ray before compensation for bellows extension.

### *Step II*

The various blocks, both existing and imaginary, of the inner dial of the *Weston* meter are assigned permanent *key* numbers, starting with .6 for the "O" block, .8 for the "C" block, .9 for the normal arrow block, etc. A more complete assignment of these *key* numbers is seen in Figure 1.

Set the "U" position of the inner dial opposite the *lowlight* reading obtained from the X-ray. Note which *key* number appears opposite the *highlight* reading. A *highlight* reading which falls between key-numbered blocks is given the *key* number of the closest block. This *key* number is utilized in Step III.

### *Step III*

Using the time-temperature-gamma charts of the film manufacturer for the film-developer combination in use, ascertain the development time for a gamma corresponding to your *key* number.

A very satisfactory method for developing eight to twelve films simultaneously, regardless of the variations in development time, is to mark each side of the exposed film holder in minutes. The holders may then be unloaded so that a progression of film hangers is in the developing tank according to time of development. The darkroom clock is set for the longest development time and the hangers removed at the necessary intervals. The *General Electric Interval Timer*, the dial of which has been hand painted with phosphorescent paint, is recommended.

Once one is familiar with the three simple steps, all necessary computations can be made within a minute or two. An overall meter reading of 100 candles per square foot, without X-ray on illuminator, is recommended. However, 25 candles per square foot is sufficient for readings in the *lowlight* portions of most radiographs.

Since the processing habits of individuals vary, especially as to methods of agitation and replenishment, it may be necessary to assign either a higher or a lower *key* number to the starting block or "O" position of the *Weston* meter. Once this factor is established, it is possible to produce from all types of X-rays, consistently good negatives that print on normal projection papers or medium lantern slide plates.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# Speedlights in Medical Photography*

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## Description of Speedlight Equipment

ELECTRONIC flash is commonly known by several generic and trademarked terms, such as speedlight, strobelight, strobe, etc. The actual equipment can be designed into many forms and the multiplicity of speedlight units is often confusing. Basically they are all similar:

1) Energy is taken from a power source such as a battery or the AC house line.
2) Energy is transformed into another form (high voltage direct currents).
3) Energy is stored in electrical storage tanks which we call capacitors or condensers.
4) At the time that the high intensity, high speed flash of light is desired this energy is discharged rapidly through a gas filled glass tube.
5) The passage of the energy through the gas in the tube produces light.
6) The total amount of light is determined primarily by the amount of energy that is passed through the tube.

The reason for the large number of different types of models of speedlights is the variations that designers use to accomplish each of the above steps and the wide range of light required for different applications. The actual method that the designer uses is of no particular concern to the user as long as the equipment is built safely and is of good quality. There are, however, basic operating characteristics that the photographer must consider when choosing the particular model for his work. These operating characteristics are:

1. *The Type of Power Source to Be Used.* There are speedlights that operate from the house line (115 volts, 60 cycles, alternating current), storage batteries, dry cell batteries, and combinations of any of the above.
2. *The Amount of Light Per Flash Required.* This depends on the type of model used, and the application, and can usually be judged by the guide numbers or the light output rating given by the manufacturer.
3. *The Time Interval Between Flashes* (often called the recharge time). In order to minimize size and weight, some speedlights take up to one minute to recharge, whereas on the other hand equipment is available that will recharge very fast with flashing rates of up to several hundred flashes per second. This factor greatly influences the size and the weight of the equipment.
4. *The Number of Light Sources Available.* Some models are designed for only one light source, whereas others have outlets for as many light sources as the photographer specifies.

*Condensed from a paper presented at the 21st Annual Meeting, Boston.
Received for publication August 20, 1952.

5. *Means of Synchronization.* For maximum utility the speedlight must be capable of being synchronized accurately and dependably with the shutter of the camera. The synchronizing circuit should be designed so that no damaging currents pass through the contacts of the camera. The difference in cost of various synchronizing circuits is often one of the reasons for the wide range of prices.
6. *Size.*
7. *Weight.*

Specific operating instructions of a particular model of speedlight are not appropriate here. Such information would be provided with the speedlight unit itself. However, the operation of all speedlight units is exceedingly simple and straightforward. With the light connected to the power unit and synchronizing cord to the camera shutter contacts properly connected, all the photographer has to do is turn on the switch. When the unit is charged operate the camera in the normal way. At the time the shutter opens, the speedlight flashes producing the necessary light for the exposure. This can be repeated as often as the recharge time of the speedlight unit will permit. In some cases it is as fast as the photographer can change film and get ready for the next shot.

Before going to other phases of speedlight technique, it should be pointed out that a speedlight light source must always be connected to its own power supply. A flash tube cannot be connected directly to the house line as you can with a common tungsten lamp. From the above description of what happens in a speedlight unit, this can be understood. However, the writer has been asked many times "Why can't a light unit be plugged into the wall on the other side of the room?" A light can be placed on the other side of the room, either by having a long cable from the speedlight power supply or by putting a second speedlight power unit with the light source and then synchronizing with other speedlights by one of several ways that will be discussed.

## Advantages of Speedlight Illumination

The following advantages of speedlight are the ones most often commented on:

1. *Cool.* There is no heat to disturb the subject or to damage living cells.
2. *Clean.*
3. *Wide Spectral Range.* Extends from the infrared into the near ultraviolet. Approximates daylight and is excellent for color photography with daylight color materials.
4. *Uniform.* With the same voltage input, every flash will be the same in both color and intensity.
5. *Fast.* Subject moves or blurs caused by camera movement are eliminated.
6. *Efficient.* Because of the simplicity of operation and uniformity of light output, much saving can be realized in operating time and in less spoilage of material.
7. *Economical.* Most speedlight units require no special power wiring to the studio. The small amount of power drawn from the line is only a fraction of that required for Mazda illumination. When compared to the cost of using flash bulbs, there is a great savings. Add in the savings in operating time and reduced spoilage of materials and one can see that a speedlight will quickly pay for itself.

Shapiro reports that wherever floods were used before, they have been able to substitute speedlight. They use it for everything from full length figures to close-ups of the eyes and have also used it for shooting specimens, for copying, and for still-lifes. No longer are patients cooked under hot floods, and where flash bulbs were necessary before, as in shooting cases involving fresh skin grafts which are easily injured with hot lights, the convenience of speedlight is incalculable.

Black and white exposures at f/45 or f/64 and color in the neighborhood of f/16 add materially to the other advantages. No more blinking eyelids or loss of detail in skin texture due to slight motion, no more squinting expressions or printed looks on faces.

**Disadvantages of Speedlight**

From what has just been said you might feel, of course, that speedlight is so wonderful that it is the answer to all lighting problems. To be fair, lets look at the disadvantages.

The amount of light you get from a speedlight unit depends primarily on the amount of energy storage in the power supply. This energy storage factor is directly related to the weight. Therefore, when considerable power is required for color work, the weight of the equipment becomes large. Also, if the equipment is adequately built for heavy duty work and for dependable operation, the unit will be heavier than an equipment designed primarily for minimum weight. Speedlight is not as portable as a flash bulb.

Another point that must be considered in hospital applications is the fact that speedlight is essentially a spark discharge device. Therefore, special precautions must be taken when it is desired to use the equipment in an operating room, especially when explosive vapors are present. At the present time steps are being taken to obtain Underwriters approval for an explosion proof light housing for use in the operating room. The current thinking is that it is best that the power supply be kept outside the operating room and a heavy duty, adequately designed cable be used to connect to the light unit in the operating room. Specific recommendations will be available after Underwriters tests are completed and approval obtained.

Some say that the weight of the units is a disadvantage and that the switches and controls are more confusing than that required by flash bulbs. However, in the questionnaire that was sent out asking for comments, this question of dis-advantages was left blank.

**Reaction of Patients, Doctors and Photographers**

Patients are intrigued by the re-use of the bulb and do not flinch from heat or bright flood lights a factor of importance with the seriously ill patients. Repeat shots are made easier because of this. Many have commented "this is the fastest and easiest that I have ever been photographed." In photographing children in medical photography as well as in general photography, speedlight is important.

The doctors approve of this light source. Dr. Penfield of the Neurological Institute, Montreal, has found it to be an answer to his problem of obtaining consistent pictures of brain operations. Shapiro states that some doctors now permit the photographing of young babies because they do not feel that the flash is detrimental to the sensitive young eyes. Doctors approve of the improved quality

of the photographic results being obtained and agree that the duration of the flash and the lack of heat do not harm the patients eyes or skin.

Several photographers who have been using speedlight since 1946 and 1947 agree with John Withee that "Routine use of speedlight for clinical photography since 1948 confirms the belief that other types of light are outdated or are of too limited use to be considered. Speedlights, camera and films are the items to be chosen for good medical pictures." Others say that they consider speedlight the finest light medium used today and verify this statement of Bert Holmes that "95% of our work is done by speedlight."

### Applications and Special Techniques

In medical photography, speedlight is being used as the light source for both color and black and white clinical photography. It is used for specimen work, for copy work, for photomicrography (both black and white and color), and for cine-photomicrography. Speedlight is also the ideal light source for the time lapse photography.

One must learn how to connect it properly with the camera and how to use the wide color range properly with filters to give separations where desired. There are some characteristics of speedlight that can be used to great advantage after a little experience. It is primarily just a source of light and just another tool for doing a job.

Much has been said about the peculiarities of speedlight. Formerly exaggerated claims were made and recommendations for excessive over-development was advised to cover up for under-exposure. Recent tests by Eastman Kodak have indicated that to achieve the same characteristic curve, a small degree of over-development is required. However, and I emphasize from practical experience, many top notch photographers under-develop. They expose more fully than some people recommend and underdevelop to achieve the tonal range desired.

### Cost Justification

The initial cost is high but this must be considered with regard to the quality of the equipment and the use expected. John Withee answers this question in the following way: "The expense may be justified to the photographer in the absolute control of quality shots resulting from a constant light output. Actual operation of our old speedlight shows a cost of around $350.00 for over 3 years' hard steady use. This includes repair costs, and figures to less than 35 cents per working day. It is a far smaller cost than can be reached with flash bulbs and if it doesn't compare with floods in cost, the difference is so small, considering the range of work accomplished, that justification of purchase should be easy."

### Good Equipment Essential

It is important that you choose equipment of maximum flexibility for the wide range of requirements commonly encountered in medical photography. It is beyond the scope of this paper to make specific recommendations. Get sound advice from the reputable speedlight manufacturers. When inquiring, state your needs in terms of materials used, the light to subject distance, the largest aperture desired, and operating characteristics required. Speedlight is not black magic, but is a simple, straight-forward way of improving photographic quality and ease of operation.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# Photographic Standards in Medical Education*

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PHOTOGRAPHIC visual aids, particularly the motion picture color film, *should* have revolutionized medical teaching. This revolution has been incomplete due to the fact that too many doctors are ignorant of the potentialities of your art. They are not aware that good illustrations are more than worth their high cost. The doctors who teach in the medical schools have had no formal education in teaching methods and little effort has been made to show them the value of visual aids. A few doctors had their eyes opened by the excellent visual teaching methods used by the Army at medical field service schools such as that at Carlisle, Pennsylvania.

## Educate The Doctor

It is up to you who are making a living at medical illustrating to educate doctors. Almost all of the troubles you have with doctor clients stem from their ignorance of the art. Most physicians start off with a case report in a medical journal with from two to six illustrations. If the presentation is a success, the physician will come back with more articles. When asked to present data to some organization, he will want from six to ten lantern slides. If the doctor develops some small technical point he may want a motion picture to illustrate this point. If a special effort is made to insure the success of his first movie, you will have won a permanent friend and client. There are relatively few ways in which a doctor can spend money for advertising and this is one of them. It is up to the medical photographer to demonstrate the method to him and to point out that any expenses incurred are completely deductible from his income tax. This is a very important point, because doctors bear an unusually heavy tax load and will welcome any way in which they can derive a tax free benefit. It may seem to the photographer that each job is a small scale project, but multiply by 100 doctors and you arrive at big business. If the doctor's presentation is successful, thanks to the illustrations, he may then procure research grants for large scale illustrations. The photographer may be in a position to direct him to research money. It does not occur to many physicians that research money is available for exactly this purpose.

## Make Books of Samples

I should like to suggest that each of you make up a sample book or two, with examples of good and bad techniques in

*Presented at the 22nd Annual Meeting, New York City, 1952.
Received for publication Jan. 13, 1953.

illustrations and in lantern slides. These can show clients what to do, what can be done and what cannot be done. Demonstrate bad examples of overcrowding on slides and illustrations. Be sure that the doctor makes illustrations in the same proportions as the page of the journal in which he is going to publish his article. Ask your doctors to arrange pathological specimens on the photographic table in the correct anatomical position so that they can conform to accompanying X-rays. Have redundant tissue trimmed away. Keep labels off the specimen. Use arrows or pointers. Have examples of photographs arranged serially to illustrate progression of diseases. Mount some X-rays and specimens side by side. Compare color with black and white, on the same specimen. Urge that a lantern slide in color and in black and white be taken so that the best result can be obtained for presentation and publication. If possible, prepare a sample movie filled with common errors: show the head and hands of the surgeon obstructing the field, demonstrate poor visualization in the incision, show bloody draperies and then clean draperies, show how long and boring repetitions with endless suturing should be avoided. You can demonstrate how the surgeon can improve his movies by loosening the tumor before removal so that it can be lifted out cleanly and quickly. You can show him how much better visualization can be obtained when the table is tilted into Trendelenburg position so that the camera can point into the bottom of the incision. Demonstrate how to omit suturing and dissection of difficult tissue planes. You can help the surgeon edit the movie in general.

You must show him these errors diplomatically, because many surgeons are very dominating people. They have been taught to rule the operating room with an iron hand, and may spoil a picture before you can voice objection. Show how to use flash-backs, before and after, and how to shorten motion picture films. You must show him most of these things in advance. When making a motion picture in an operating room, it is well to visit the operating room nurses and supervisors ahead of time. In this way, you can work up a good rapport with them. They will cooperate with you much more satisfactorily in the matter of electrical outlets and stools and extra equipment when the time comes, if they have met you ahead of time. I would urge you also to bring two motion picture cameras into the operation will not be missed. Make sure that your equipment is tested ahead of ing room, so that if one is out of order at any time, the vital part of the operatime and that everything is working. Be certain to have explosion proof switches for operating room work. Arrange matters so that the patient does not see the camera and does not know that a motion picture is to be taken; at the same time make sure that your material is set up rapidly enough so that you do not miss the incision. In demonstrating all these things to the doctor ahead of time, do not show him examples of motion pictures or exhibits which cost $5,000. This will discourage him before you even get started. Do try to show him something which is comparable to the thing he will want.

### See The Doctor's Side of It

The doctor slaves right up to his deadline, working between patients, and then will not realize why you cannot put together his little group of slides over Sunday, for his speech on Monday

morning. You must look at it from his standpoint; the standpoint of the zealot. He does not realize that you have twenty such little jobs to do that week. He will ask you to give up your week-end. He will tend to cram too much material on each slide. His motion picture may be full of repetition. Don't get angry with him! Educate him! Be pleasant about it.

**Attitude Before Patient**

Be careful of your attitude before the patient. The sick person is no longer the rational person that he was when he was well. Do not permit levity in the photographic studio. Do not joke back to the patient even though he may try to be humorous to cover up his embarassment. Do not permit loud laughter in the dark room or in the adjacent rooms. Patients who are in the nude resent this bitterly, since they always suspect that somebody has seen them and is laughing at them. Do not violate the modesty of any of your patients. Be sure that all of the doors are closed that everything is quiet and that their exposure is as brief as possible. If you are questioned by the patient, emphasize the point that photographs are not for display but are only for scientific information. Remember that the patient will always try to get information from you about his condition. He will want to know if you ever saw anything like it, if you think his condition is serious, if it is cancerous. Patients have even gone to the extent of instituting law suits because of information which photographers or other hospital personnel have allegedly given to them as off-hand statements. It is always best to refer them to their doctor for information of any kind whatsoever. It can always be emphasized that the photographs are merely for comparison with their condition as it will be later on. Try to maintain a serious, dignified, quiet atmosphere in the photographic studio, but be pleasantly non-committal.

**Be Business-Like**

Run your illustration business on a business basis. I realize that a large number of the medical photographers who will read this article are involved in institutional work and are not in competition with other photographers. Nevertheless, any good work that you can do at this time, will lay the ground-work for an independent business career later, if you should wish it, and in any case will create good will for the profession as a whole. If you are in business for yourself, I would urge you to remember the basic premise that if you do a good job for a doctor, you will end up as a personal friend of his and that he will then give you more and more business on the basis of the success of his first ventures. You will find that the amateur photographer among doctors will be a source of competition. You need only point out to him or demonstrate to him that the quality of your work is infinitely better than his, and the fact that he can make more money at practicing medicine than he can at photography. If he makes more money he will be able to pay for better quality photographic work. Tell the doctor of some other doctor acquaintance of yours who invested a lot of money in expensive photographic equipment and then became so busy that the photographic equipment now sits idle on the shelf. This is a very convincing argument. Remember also to give him a receipt for any work you do, so that he can use it as an income tax deduction.

Legal photographic work is another

fruitful field to explore. Acquaint the doctors in your community with examples where photographic illustrations helped to win law-suits involving medical subjects. A good photographic illustration has convinced many a jury. The expenses of this type of work will very frequently be borne by an insurance company so that the doctor will be glad to order as many illustrations as are necessary.

The economy waves which are now striking the government agencies such as the Veterans Administration, may result in the curtailment of Veterans Hospital Illustration Laboratories. If the Veterans Administration is curtailed, most of the motion pictures which are now shown at medical conventions, and many of the large medical exhibits, will again be done by private medical illustration laboratories. This will be a great boost for your business, and current developments are bringing this day closer and closer.

I would urge you to make a lay-out for every illustration. Make it and go over it with the doctor for detailed written instructions. Try to do the job at once while the lay-out and instructions are fresh in your mind. Deliver your work on time. This is one of the commonest complaints by doctors who request illustrations. Try to standardize your prices. Explain why they are expensive in that they are hand work. It would be desirable if a booth could be set up at medical conventions to accommodate the last minute speaker who has broken or lost one of his slides. Make it very clear to the doctor how poor the pictures will be if he does not give you advance notice and does not help you in their preparation.

Prepare your convention equipment ahead of time. Try the projectors and run through the slides. Carry a small repair kit to the meeting, or see that the doctor does. If the slides do not work or the projector fails, the doctor will be embarrassed and it will discourage him from coming back for more business. When working in operating rooms, again, please try to see that the complete equipment does function. See if there is space enough to tilt your camera. See that you have explosion-proof switches. Be sure that you have an assistant who can hand you film, etc. Operations give you only one chance. If you are too late, or if equipment does not work at the last minute, the entire procedure may be lost.

**Receptionist**

The receptionist in your office is a very important link. She may unconsciously take the attitude that your studio is over-worked and cannot be bothered with additional jobs. A pleasant and sympathetic office girl will help business greatly.

Remember that most of the difficulties mentioned here can be corrected if you explain to doctors and to medical educators, with illustrations of right and wrong, how they can help you and how you can help them. It is my belief that the future of good medical education lies with you people and your art.

Journal of the Biological Photographic Association Vol. 21, No. 1 February, 1953

# Factors Which Improve Clinical Motion Pictures*

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THERE are several ways in which routine clinical motion pictures of patients can be made more forceful and effective. Some of the factors concerned are standardizing lighting, furniture or props, backgrounds, draping of patients; size of the film image and the sequence in which the scenes are exposed.

Care given to these factors is certainly helpful, and may be essential, when a series of progress shots of patients before, during and after treatment is being made, particularly when the series extends through weeks or months.

## Lighting

When a specific condition is to be photographed at intervals, a lighting diagram which shows the position of the lights, their intensity, the distance from the patient and the distance from the background should be made. Each time this condition is photographed, reference can be made to this diagram, so that the lights and the patient can be placed in positions which will assure uniformity of the lighting effect throughout the series. In fact, several records may be useful, since patients frequently will be shown both in long shots and close-ups, and one lighting plan may not be desirable for all scenes. Lamps burning at their rated voltage in reflectors which are clean and in good repair will be necessary when color film is used.

A good photoelectric exposure meter, properly used, is helpful in achieving consistent exposures. Processing variations will be encountered occasionally, but usually they will be within acceptable limits for duplication.

## Furniture

Furniture that is shown in scientific films should be simple in design. The use of ornate or highly colorful props should be avoided unless they contribute to a desired special effect. In the filming of the motion picture showing the effect of cortisone and ACTH or rheumatoid arthritis which was prepared for Drs. Hench, Kendall, Slocumb and Polley, care was exercised to assure that the patients would appear in the same surroundings, with the same furniture, walking up and down the same set of steps and being examined in the same manner, in all sequences. In addition to helping to illustrate the comparative condition of each patient at subsequent visits, this technic of standardization established continuity throughout the film. As was true in the matter of the steps over which these patients climbed in the cortisone film, special props may have to be built to illustrate an action. When the steps in question were built, special care was taken to see that they had the same size risers and treads as the usual home steps (fig. 1). The chair used in this film was

* Received for publication Jan. 20, 1953.

armless, for two reasons: (1) the patients were not to have assistance in rising from the chair, and (2) no part of the chair was to obstruct the camera's view of the patient.[1]

A neutral-tone background, with no doors, windows or patterns, helps to focus the attention of the audience on the action or condition depicted in the film by eliminating distracting extraneous details. Moreover, maintenance of the same relative amount of illumination on the background and the patient throughout all sequences will obviate distracting changes in the density or hue of the background.[2]

### Draping

Some patients can be photographed in street clothes or in hospital gowns, but clothing never should be allowed to interfere with the clarity or simplicity of the scenes (fig. 2). By planning in advance and referring to the record made at the initial filming session, the draping of the patient can be standardized throughout the film. Sometimes, on the other hand, unobtrusive changes in the draping or clothing worn by the patient will be valuable in that they can be employed to suggest an intervening lapse of time. When clothing must be removed, a dressing room should be provided. Care should be taken to insure that disrobing will not cause unnecessary embarrassment to the patient. The attendance of a nurse or woman assistant is especially important when a woman patient is to be photographed by a man.

### Size of the Image

Uniformity of the size of the image on the film can be controlled by photographing similar scenes with the same focal-length lens from the same distance. A record of the particular lens and distance used is helpful when the interval between visits is long. When attempting to arrive at a standard image size, the photographer should consider normal variations in subject size. For example, in a close-up shot of hands, unless care is taken, a child's hands may appear too small and adult hands too large when photographed from the same distance. In either instance, the image size chosen should be such that normal changes in size caused by growth or the disease will not necessitate changing the object distance during a series of filming sessions. When edema is present, it is difficult to evaluate changes if there are significant changes in the size of the image.

### Sequential Factors

By establishing a routine when he is to photograph a specific condition, the photographer can shorten the session under the hot lights, which of course will contribute greatly to the comfort of the patient. A record of this routine should be kept; it will help to avoid omission of important sequences. For example, if the surgeon requests "movies, to show gait" of a patient before and after performance of cup arthroplasty, he may not accompany the patient for the filming. By keeping a record of the action which it is known that the surgeon wishes to be shown, the photographer will be able to work more smoothly, with a resulting saving in film and time. When a postoperative sequence is requested, and it is known that the patient was photographed before the operation, double checking can be done by inspection of the previous sequences.

When an actual physical examination is being filmed, the physician, of course, is present, but at other times the patient may come to the studio alone. In such an instance the photographer should be familiar with the action the physician

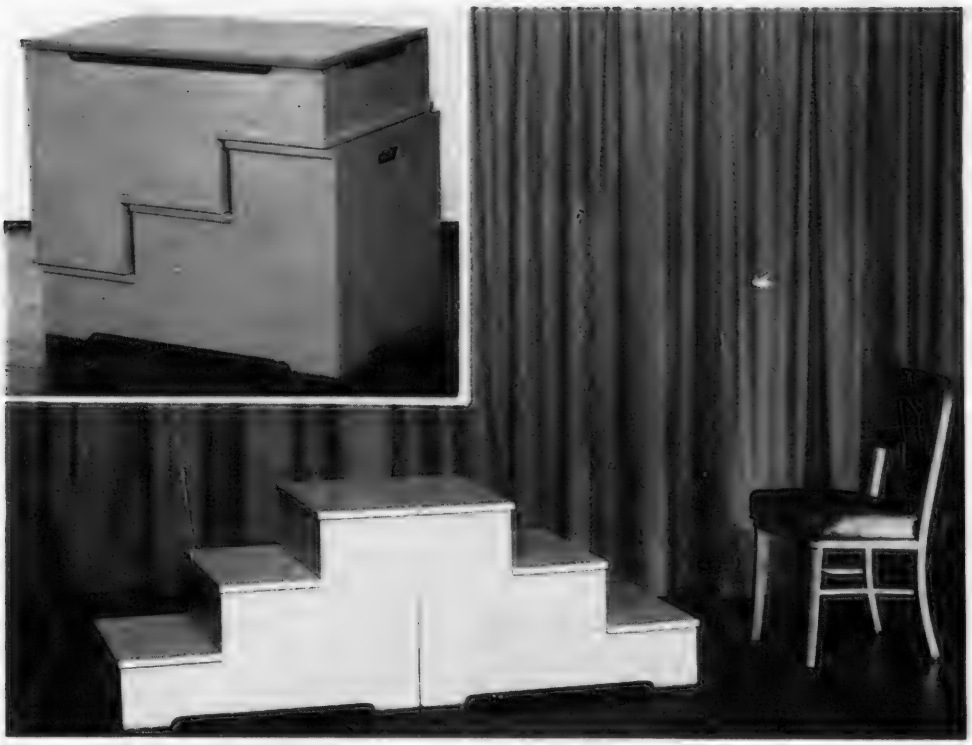

Fig. 1. At times special props will have to be built to show effectively a particular movement. Here, for example, a set of steps was built having the same size risers and treads as normal home stairs. The inset shows them stacked for storage. The plain, armless chair makes it possible to see more detail as the patient rises, and is less distracting than an ornate armchair.

Fig. 2. Clothing should never be allowed to interfere with the clarity or simplicity of the scene, and should not restrict the movements required of the subject.

wishes to be shown. The purpose of the filming should be explained to the patient, and if advisable he or she should be allowed to rehearse the action. If, on the other hand, a rehearsal will "limber up" the patient, so to speak, and leave an erroneous impression of his condition or if a rehearsal will cause unnecessary pain, the physician or the photographer can demonstrate the action the patient is to follow. Patients usually are more co-operative when they understand what is being done and what is expected of them.

Here again, if scenes are taken in logical sequence — all long shots at once and all close-ups at once — less time will be consumed in moving the cameras and lights, and the action can be explained more easily to the patient. The scenes later can be edited into the desired sequence for the finished film.

**Other Factors**

When the speed of action is important in determining the change in the patient's condition, this should be explained to the patient. When arthritic patients are to be photographed walking, going up stairs or raising their arms above their heads, they should be asked to do these things as rapidly as possible each time they are filmed, so that comparisons of the speed and ease of movements of the patient at different sequences can be made by those who will see the finished film. This also emphasizes the need for use of exactly the same camera speed on all visits of the same patient, or all patients in a series. Use of the same camera speed for *all* filming will make the splicing of films more satisfactory.

Short strips of film can be identified readily by writing the patient's name or number, the date, the hour (when time is a factor), the physician's name, or other useful data on a small slate and photographing this slate at the beginning of the film. This is particularly important when several patients are to be photographed on the same roll of film and when other objects in the scene will not establish identity or time. A reel card on which similar data are recorded may be kept with the film; it serves as an additional check.[3]

Judicious editing of clinical motion pictures is required to make an interesting and informative film. Parts of the original footage which are too long or are technically undesirable should be removed, and the tempo and continuity should be controlled. Brief, clear and informative titles contribute to the understandability of this type of film.

**Summary**

Some methods for improvement of the appearance, effect and value of motion pictures of clinical subjects have been described. When motion pictures of a given medical or surgical condition are made routinely at intervals varying from days to months or even years, continuity and effectiveness of the presentation can be improved by standardizing lighting, furniture, props and backgrounds, draping of the patient, size of the image and the sequence of scenes. Careful editing and titling can improve the tempo, continuity and forcefulness of clinical motion pictures. Some specific examples have been illustrated.

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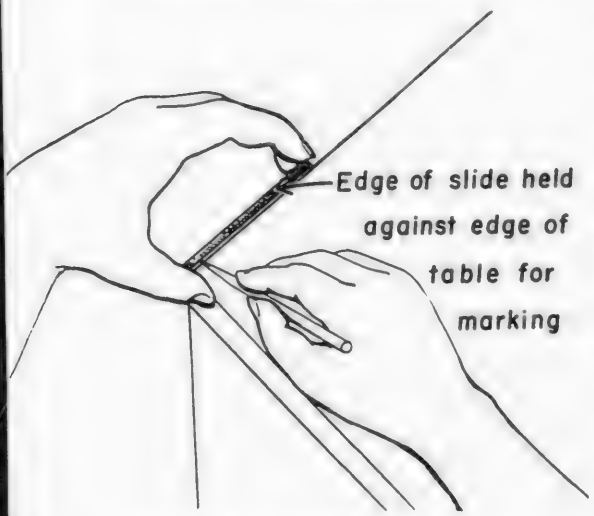
# Method for Marking Lantern Slides*

ELLA MAY SHACKELFORD BRECKENRIDGE
Veterans Administration Hospital, Houston, Texas

INDEXING and filing lantern slides in a central repository so that they may be readily accessible was a problem for the V. A. Hospital Medical Illustration Laboratory in Houston. From the day book in which the job is entered and given an identifying number, the lantern slides are identified with the corresponding number which is marked on the left upper edge of the slide binding. The slides are then filed in the vertical position with the 4" dimension in the horizontal plane. While the new slides are in the file drawer, colorless nail polish is streaked across the number to add to its permanence.

It has been determined that ordinary gummed paper binding tape is more satisfactory in the warm damp climate. From what we have seen of "visiting" lantern slides we are inclined to believe that the paper binding is the most satisfactory over a period of time.

To make our identifying number as clearly visible as possible we use a sharp point on a yellow crayon pencil. It is quickly done and is remarkably brilliant on the black binding tape. (See figure below).




*Received for publication May 13, 1952.

# Notes on Retouching Color Prints*

MAUDE BELLING VARDEN
Pavelle Color Incorporated, New York, N.Y.

IT almost never happens that a color print is produced by the dye-transfer process entirely free from blemishes. This is not inherent in the process, but arises from the fact that in making color correction masks, separation negatives, printing matrices or the final print itself, ample opportunity is provided for picking up specks of dust, etc.

Eliminating these blemishes is simple provided one can get away from the idea that color print retouching is done the same as black and white print retouching. A light spot in a black and white print is eliminated by a gray spotting color to match the area with the surround. With color prints a light spot is often matched to the surround by adding the complementary color of the spot to darken it, rather than adding the color of the surround. A light blue spot, e.g., in a gray sky is made to match the gray by adding yellow dye, not gray. The same dyes that are used in the printing process are preferred. It is best to build the spot up slowly, because dark spots produced from over retouching are difficult to remove. The brush should not be too wet, otherwise the dye solution spreads beyond the border of the spot, causing a ring.

Dark spots can be etched with a broken razor blade that gives a sharp tip. Light strokes are necessary to prevent "digging". The matte appearance can be minimized with gum arabic solution.

Large light areas can be washed over with dye solution using a soft brush or cotton. Again it is advisable to build up to the density required slowly.

Large dark areas should be bleached. Kodak Reducer R-2 is made for this purpose. Use inexpensive brushes because the bleach ruins a brush rapidly. Brown stains after bleaching are removed with 1% sodium bisulfite solution. Keep the bisulfite solution as local as possible. It can cause slight bleaching of the cyan dye around the area being treated.

*Based on demonstration given at 22nd Annual Meeting, N.Y.C., 1952

# The Society of Motion Picture and Television Engineers*

HERBERT BARNETT

(This is the first in a series of invited papers on leading photographic organizations.)

THE Society of Motion Picture Engineers was founded in 1916, as a non-profit, technical organization to represent all segments of the motion picture industry: equipment and materials manufacture, production, distribution and exhibition. The Society's principal objectives since its inception have included:

1. Advancement in theory and practice of engineering in motion pictures and allied arts and sciences.
2. Standardization of equipment and practices employed therein.
3. Publication of scientific information in the fields encompassed.

It has not been necessary to alter these objectives in order to pursue a policy of readily embracing new arts and interests as these develop. A most recent demonstration of this progressive attitude was the change in name to recognize officially and welcome engineers in the related field of *television*. In 1949 we became the SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS.

Membership totals nearly 4000 in 50 different countries. The governing body consists of eight officials and fifteen governors elected by the membership. For maintenance and stimulation of current interest, this country is divided into three sections where a Chairman and Board of Managers arrange and conduct local activities, including frequent technical meetings. A headquarter's staff of fourteen employees is located at 40 East 40th Street in New York. The staff is responsible for publication of a monthly journal, maintaining membership records, coordinating technical committee work and producing and distributing test films used as standard references throughout the industry.

Two national conventions are held annually with principal emphasis on presentation of technical papers in all segments of motion picture engineering, including the rapidly developing science of high speed photography, sound recording and reproduction — both magnetic and optical — and certain aspects of television.

One of the most important technical functions of the Society is that of committee work directed toward the formulation of recommended practices and industry standards. There are some eighteen active committees dealing with a variety of subjects, including:

Color Photography
Film Dimensions
Laboratory Practice
Preservation of Film
High Speed Photography
Studio Lighting for Motion Picture and Television Optics
Screen Brightness
16 mm and 8 mm Motion Pictures
Theatre Television

From its inception the Society recognized the need for standardization and has continued work to that end. In cooperation with Motion Picture Research Council, some sixty American Standards have been adopted which are almost universally used throughout the industry on a strictly voluntary basis. Thirteen test films are produced and distributed for use in checking and maintaining these standards.

In addition to a monthly journal, the Society makes available reprints and special reports on a variety of subjects. Among the more important of these are the volumes relating to *high speed photography*. This material was selected for publication by a committee of specialists and represents perhaps the most complete treatise on the subject to be found anywhere. Other important material includes, *Principles of Color Sensitometry*, *Theatre Acoustics Forum*, *TV Lighting*, *Films in Television*, and *American Standards on Motion Pictures*.

The Society participates in activities of the American Standards Association and the International Commission on Illumination. It maintains close liaison with the Institute of Radio Engineers, Radio and Television Manufacturers Association, and other organizations having related interests. We welcome collaboration with photographic societies and others in exchange of information, joint participation and the avoidance of undue duplication.

*Based on paper presented at the 22nd Annual Meeting, N.Y.C., 1952.

# BOOK REVIEWS

***HIGH SPEED PHOTOGRAPHY, by George A. Jones, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y., 311 pages (1952), 5½ in. x 8½ in., cloth bound, $6.50.***

This is the second book written by British authors in the past two years on high speed photography. The first book was by W. D. Chesterman entitled *The Photographic Study of Rapid Events (1951)* which is a useful reference, but somewhat limited in scope. Mr. Jones' treatment has a much wider scope and is no doubt the better of the two books for the general worker, especially if he has had no previous experience in high speed photography. The book covers both still and motion picture photography and includes separate chapters on scientific applications of high speed photography, as well as industrial and commercial applications. The book begins with an interesting history of the various discoveries out of which high speed photography developed, and then progressively develops the subject from simple spark discharge photography through the latest techniques. There are 11 chapters in all and 118 illustrations. Each chapter has a separate bibliography. The book can be recommended for those who desire a general, overall view of the subject without expecting step by step working methods. The biological photographer will be glad to see at least brief treatments of the applications of high speed photography in botany, medicine, photomicrography and zoology. However, it is unfortunate that this part of the book could not have been expanded to give a more useful coverage of these important applications.

**LINHOFF GUIDE, *by Dr. Otto Croy, Heering Verlag, Germany (1952), 68 pages.***

An English translation of Dr. Croy's practical booklet has been made available by Kling Photo Supply Corp., 235 Fourth Ave., New York 3, N.Y. It is priced at 50c.

**VISUAL AIDS IN FUNDAMENTAL EDUCATION, UNESCO, *Paris (1952), 5¼ in. x 8½ in., 168 pages, paper cover, $1.75. (Order from Columbia University Press, 2960 Broadway, New York 27, N.Y.***

This is a compilation of a series of studies on specific problems of mass communications. Its various sections are written by different authors who have applied visual aids to special communication problems throughout the world. Most of the sections pertain to the production and use of films and other visual aids for educational purposes in undeveloped countries where a large proportion of the population is illiterate. The viewpoints of the authors may not always be agreed with, but the book makes stimulating reading for anyone engaged in visual aids activities.

**PHOTOGRAPHY THROUGH THE MICROSCOPE, *Kodak Industrial Data Book, Eastman Kodak Co., Rochester, N.Y., first edition (1952), 68 pages, 50c.***

This is a basic booklet on photomicrography not intended for the specialist. It can be recommended to the beginner because it presents the subject simply and understandably, even if not comprehensively. After dealing briefly with applications of photomicrography and photomacrography, an elementary discussion of the microscope is given. This is followed by a short description of the microscope and camera in combination. In the remainder of the book are sections on light sources, photographic materials, illumination, filters, color photomicrography, procedure and determination of exposure. A special section is devoted to photomacrography, ultraviolet and infrared photomicrography, phase contrast work, cinephotomicrography, and electron microscopy. Data on Kodak films and plates are also included, as well as a bibliography of books and articles, and a list of manufacturers of photomicrographic equipment.

**HIGH SPEED PHOTOGRAPHY,** *Volume 4, Society of Motion Picture & Television Engineers, 40 W. 40th St. New York 18, N.Y., 166 pages plus a 4 page cumulative index of Volumes 1 to 4, (1952), 6 in. x 9 in., paper bound, $2.50.*

This is the fourth in a series of monographs on high speed photography published by the Society of Motion Picture and Television Engineers. Actually it is a collection of seventeen papers previously published in the JSMPTE. It forms a convenient reference for those interested in high speed motion picture techniques and applications. The first paper by Kenneth Shaftan entitled *Progress In Photographic Instrumentation in 1950* is particularly valuable because of its numerous references in all fields of photography, including medical photography, microscopy, radiography and underwater photography.

**AMATEUR FILM MAKING,** *by George H. Sewell, F.R.P.S., Second edition, Blackie and Son, Ltd., London, 128 pages (1951), 5 in. x 7½ in., illustrated, cloth bound, $1.25.*

Mr. Sewell's book is well known to many amateur motion picture fans. It was first published as one of the Blackie's Technical Series in 1938 and has been brought up to date in this new edition to include explanations of more recent subjects such as lens coating and T stops. There are twelve chapters ranging from the fundamentals of motion picture photography through all steps necessary to the production of the final film. It is not a book that could be recommended to the experienced worker but it is one that such workers can recommend to their friends who pester them with basic questions.

**TECHNICS OF PLANT HISTOCHEMISTRY AND VIROLOGY,** *by T. E. Rawlins and William N. Takahashi, The National Press, Millbrae, Calif., 125 pages (1952), 5½ in. x. 8½ in. cloth bound, $3.50.*

The greater part of this book deals with the histochemical detection of various compounds in plant cells and in cell walls. It emphasizes the use of the polarizing microscope in determining fine structure. Chapter 9 is a brief treatment on photography and photomicrography, but contains nothing beyond very elementary discussion. Since the book is used as a text for a course in advanced technic in the Plant Pathology Division of the University of California, it is surprising that no mention is made of phase microscopy.

**THE MOLECULAR ARCHITECTURE OF PLANT CELL WALLS,** *by R. D. Preston, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y., 211 pages (1952), 5¾ in. x 9 in., cloth bound, $6.75.*

This book will be of interest primarily to botanists and of much lesser interest to biological photographers. However, it does contain sections on staining, X-ray crystallography and polarization optics.

**MICROFILMING WITH KODAGRAPH MICROFILE EQUIPMENT AND MATERIALS,** *Kodak Industrial Data Book, Eastman Kodak Co., Rochester, N.Y., First Edition, (1952), 60 pages, 50c.*

This is one of a series of Kodak Data Books which deal with specific applications of photography in industry, science and business. It contains a discussion on the advantages and applications of microfilming, equipment and processing, reading machines, properties of sensitive materials, microfilming technique, and other useful sections. A short bibliography of pertinent references is also given, as well as a list of manufacturers of special equipment.

**PLANNING THE X-RAY PROCESSING FACILITIES AND EQUIPMENT,** *Medical Technical Service, Medical Division, Eastman Kodak Company, Rochester, N.Y., no date, 89 pages, illustrated.*

This booklet is a compilation of articles which appeared in Medical Radiography and Photography during the years 1948 and 1949. It fully discusses and illustrates the planning of darkrooms including the physical layout of the space, light traps, ventilation, darkroom illumination, materials for processing, tanks, plumbing, temperature control, etc.

COLOUR IN THEORY AND PRACTICE, *Edited by H. D. Murray, Chapman & Hall Ltd., London, illustrated, 360 pages (1952, 7½ in. x 10 in., cloth bound, $10.00.*

This is a revised and greatly enlarged edition of a book originally published in 1939, written by H. D. Murray and D. A. Spencer. For the new edition Mr. Murray has written a number of the chapters and acted as Editor-in-Chief for seven contributors, all of whom are well known in the field of color. The subject is broken down into four major parts, namely Physical and Chemical Aspects, Physiological and Psychophysical Aspects, Light Sources of Colorimetry, and Miscellaneous Aspects, the latter containing material on the selective use of color and color in nature.

The book is probably the best general treatment available on the subject. It is necessarily written on a somewhat advanced plane for the average photographer, but the non-mathematical parts will be readily understood by anyone. It is not a working manual on color photography. Nevertheless, it is a book that every color photographer should read because photographers seldom possess enough basic information about the subject of color, *per se*, to understand its many peculiarities. The editor has been careful to point out the confusion that might arise as a result of following the terminology recommendations of the British Physical Society. The most important terms contained in the report on Color Terminology published by the Physical Society in 1948 are included as an Appendix with the recommended definitions. In all, there are 22 chapters. The titles of a few of the chapters will indicate the thoroughness of the book's contents: *Color and Chemical Constitution, The Character of the Visual Response, Color Matching and Measurement, Systems of Color Description and Specification, An Explanation of the Visual Processes, Spectrophotometry, Visual Colorimeters, Physical Photometers and Colorimeters.* The Editor and his contributors are to be congratulated on putting together in one volume hundreds of important facts concerning color that are not found in books intended for the photographic field.

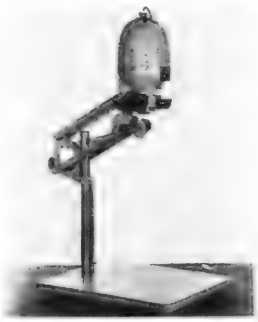
ARTIFICIAL LIGHT AND PHOTOGRAPHY, *by G. D. Rieck and L. H. Verbeek, Philips' Technical Library, N. V. Philips' Gloeilampenfabrieken, Eindhoven, Holland, 360 pages, illustrated (1952), 7 in. x 11 in., cloth bound $8.25. (Distributed in America by Elsevier Press, Inc., 402 Lovett Blvd., Houston 6, Texas.*

It would be an injustice to biological photographers if one did not review *Artificial Light and Photography* in the most glowing terms. In this reviewer's opinion it is one of the best books ever offered to the photographer. Mr. A. L. M. Sowerby, editor of the British periodical *Amateur Photographer* who wrote the foreword to the English translation — apparently feels the same way. He states " . . . . it covers its subject with such thoroughness that every worker, whatever his field, will find in it understanding and knowledge that will enable him not only to improve his photographs, but to become so completely master of his lighting that he can attain the results he desires with confidence and certainty".

There are eight main chapters, each of which is subdivided into separation sections, the total number of sections being 218. In addition, there are ten tables giving data on color temperature, reflection factors, comparative speeds of film materials, filters, etc. Although the book is intended for the practical worker it is indeed on a higher level than most popular works. The technical data, however, are well balanced with the practical working recommendations. The authors apparently have made a distinct effort to prevent the book from becoming topheavy, but they have been careful to include sufficient technical material to allow the reader to get a full meaning of the subjects discussed. The American reader will find no products described that are readily available, but this does not detract from the general text which is universally applicable. Besides the basic sections of the book, there are several special sections devoted to infrared photography, ultraviolet photography, microphotography, clinical photography and stroboscopic photography. (The term *microphotography* is frequently used in Europe in preference to photomicrography.)

# New Products

## NEW AUTOFOCUS ENLARGER



Camera Specialty Company, Inc., 50 W. 29th St., New York 1, N.Y., are the factory representatives in the U.S.A. for the new Primos Autofocus Enlarger for 35mm film. The enlarger is all metal construction, incorporating a diffused source of illumination plus a single condenser. It has a so-called color head and is claimed to be very rigid, with a high light output. The enlarger has a range of from 2 to 10 diameters, but enlargements greater than 11 in. x 14 in. can be made with manual focusing. It comes equipped with a Steinheil f/3.5, 50mm Culminar coated lens with click stop diaphragm settings. Price without lens $113.00 list. Price of lens $30.00 list. The color head is priced separately at $15.00 list.

## DARKROOM FOOTSWITCH

The Wirgin Model II Footswitch has just been announced by Camera Specialty Company, Inc. It is constructed of aluminum and is recommended for enlargers, contact printers, light meters, timers, and other electronic apparatus where it is desirable to have free use of one's hands. It is equipped with a 6 ft cord and combination plus. List price $5.95.

## NEW DEVELOPER AND REPLENISHER

A new developer and replenisher, called Normatol, has been introduced by Ansco. It is a packaged developer available in one quart and one gallon sizes and replaces the Ansco #17 packaged developer. It is claimed to give fine grain and high film speed.

## ANNOUNCEMENTS FROM CARL ZEISS, INC.

Carl Zeiss, Inc., 485 Fifth Ave., New York 17, N.Y., importers of Zeiss-Ikon cameras manufactured in the U.S. Zone, are seeking outstanding black and white negatives made with Zeiss-Ikon cameras to be used for display enlargements. Pictures are purchased for display and advertising rights only. The original negatives are simply borrowed for a limited time and credit to the photographer will be given on exhibition prints displayed. Prints only should be submitted for consideration, accompanied by a self-addressed, stamped return envelope. Address prints to the Picture Editor.

Carl Zeiss, Inc. has also announced that the new Universal View-Finder for the Contax IIa and IIIa cameras is now available at all authorized Zeiss-Ikon dealers. This new finder covers the fields of view of the 25mm, 35mm, 50mm, 85mm and 135mm focal length Contax lenses. It is equipped with a parallax correction adjustment, as well as a means for focusing the eyepiece to suit each individual. It can also be used on the pre-war Contax II and III cameras. List price, complete with leather case, $8[illegible].

Another new item from Zeiss is an improved model of the Contameter, an accessory for close-up photography. At present it is available only for contax cameras and fits the pre-war models II and III as well as the later models IIa and IIIa. Three screw-on 10.5mm supplementary lenses are furnished to cover 8, 12 and 20 inch distances. List price, complete with lenses and plush lined leather case, $81.00.

A new model Ikoflex camera, the IIa, is now available. It is a twin-lens camera, equipped with a Zeiss-Opton Tessar f/3.5 coated lens in a Synchro Compur shutter giving sychronized speeds up to 1/500th second. Ikoflex accessories such as the Ikopol Polarizing Filter, Ikoprox parallax corrected close-up lenses, Prism Reflex Focusing Eye-Level Device, filters, lens, shades, etc., are interchangeable on all post-war Ikoflex cameras.

### KODACHROME IN STEREO LOADING

Kodachrome Film, Type A, 335, in a stereo loading for use with photoflood or photoflash illumination, is now available. The new film is for use in stereo cameras making 23 x 24mm stereo pairs with standard spacing between pictures. When the film is sent to Kodak for processing, the stereo pairs will be mounted for hand viewing without additional charge.

Stereo mounting in connection with this new loading will be available only at the Kodak Processing Laboratory at Rochester, New York, until early in 1953. After that date, it is expected that stereo mounting will also be available from the Chicago and Hollywood Kodak Processing Laboratories. Therefore, stereo camera users who desire to have their stereo pairs mounted in standard Kodaslide stereo mounts, should send their films only to Rochester for processing until further notice.

The new film will produce 20 stereo pairs of pictures and will list for $4.75 including tax, per roll. The price includes the processing, stereo mounting as described above, and return transportation to customers within the United States and its territories and possessions.

### DU PONT FILM CLEANER

The same type of chemical that freezes ice in a refrigerating system and serves as the cooling agent in air conditioning is now proving itself, according to news from Du Pont, as a better, faster photographic film cleaner. It is Du Pont "Freon-113" fluorinated hydrocarbon, a non-flammable liquid without odor. Tests reported by the Motion Picture Research Council, Inc., show "Freon-113" to be "much less toxic, better in some cleaning operations, and equivalent in all other operations tested" in motion picture studio work.

### NEW FILM DRYER

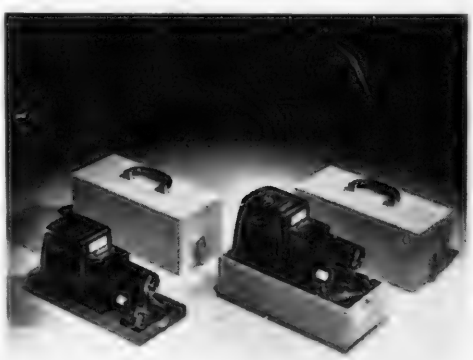
Bar-Ray Products, Inc., 209 — 25th St., Brooklyn 32, N.Y., has announced a new film dryer, called the Bar-Ray Posidryer, which is claimed to dry up to twelve 14 inch x 17 inch films within twenty minutes at 55% relative humidity. It operates on 110 volts, 60 cycles single phase A.C., drawing 15 amperes. List price $125.00.

### TWO NEW KODASLIDE PROJECTORS

Two new Kodaslide Projectors — the Kodaslide Highlux II and the Kodaslide Highlux III — have been announced by the Eastman Kodak Company. The Highlux III, the more powerful of the two, incorporates a newly designed optical system with a Lumenized glass reflector, two Lumenized condenser lenses, heat absorbing glass and a Lumenized 5-inch f/3.5 Kodak Projection Ektanon Lens. This results in the maximum light output from the 300-watt lamp provided with the projector. It is equipped with a controllable blower.

The Highlux II Projector is equipped with a 200-watt, 120-volt lamp, and a Lumenized 5-inch f/3.5 Kodak Projection Ektanon Lens. It is designed so that it may be adapted at a later date to accommodate a 300-watt lamp and blower.

The Kodaslide Highlux II Projector is priced at $36.50 list and the Kodaslide Highlux III Projector, complete with Blower case, is priced at $56.50 list. The Kodaslide Highlux Blower Case to convert the Kodaslide Highlux II Projector into a Kodaslide Highlux III Projector when fitted with a 300-watt lamp, lists for $19.20. A separate Kodaslide Carrying Case for the Highlux II is priced at $9.50.



### UNDERWATER CAMERA EQUIPMENT

A new catalog, just issued by the Fenjohn Underwater Photo and Equipment Company, 90 Crickett Ave., Ardmore, Pa. shows their underwater camera, exposure meter, pressurizer, etc. The catalog gives full specifications for their comera as well as prices for all underwater photography equipment manufactured by Fenjohn.

### 35mm PENTACON CAMERA

The recently organized Pentacon Corp., 50 W. 29th St., New York, N.Y., announces the availability of a 35mm camera called the Pentacon, manufactured in Germany by the Zeiss Corp., a division of Carl Zeiss, Jena. (The camera, of somewhat different internal design, was formerly sold in the United States under a different name.) It is a single lens reflex type and features a new prismatic eye level view finder which operates directly through the camera lens. The photographer sees a full size image that is upright and non-reversed. It can be used with a microscope adapter. The Pentacon is equipped

with a Zeiss 58mm f/2 Biotar and a 50mm f/2.8 Zeiss Tessar, both with T stops, coated elements. Its focal plane shutter has a speed range from 1 sec to 1/1000 sec, plus bulb and delayed action timer. The shutter is internally synchronized for flash, both standard flash lamps and electronic flash. Accessory equipment for scientific and medical photography are available, including micro and macrophotography units. List price $359.50 with f/2 Biotar lens; $299.75 with f/2.8 Tessar lens. A leather case and flash gun are available separately at $15.00 and $15.50, respectively.

### NEW RECORDING CAMERA

A new compact, light-weight, and inexpensive recording camera, the Auto Camera Mark 3, is announced by J. A. Maurer, Inc., Photographic Instrumentation Division, 37-01 31st St., Long Island City 1, N.Y. Originally

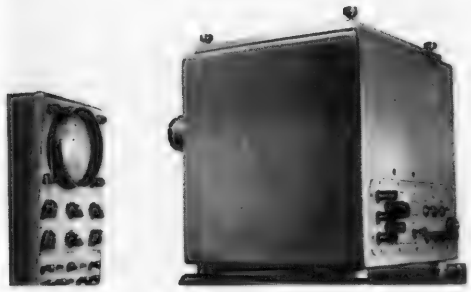
designed by D. Shackman & Sons Ltd., London, England, the camera is said to be finding application for a wide range of scientific, engineering, and industrial purposes. Accessories are available to permit its use for time-lapse recording, photomicrography, normal and stereo photomacrography, aircraft instrument recording, chemical experiment recording, traffic and highway condition recording, etc. Photography may be automatically accomplished to speeds as fast as 4 pictures per second or at intervals from $\frac{1}{4}$ sec to as long as desired. In this way, any number of events may be recorded over relatively long periods of time.

The Auto Camera Mark 3 is fully automatic in operation. A special spring motor provides, with one winding, the exposure of 31 ft of 35mm film held in special cassettes. Both the exposure and film transport functions are effected by a single electrical pulse. Operating voltage is preset at either 12 or 24 Volts DC. An electrical contact is incorporated to provide for an external exposure indication or to flash an electronic-flash light source. The camera may also be controlled manually.

Five shutter speeds from 1/10 second to 1/200 second, and time exposure are provided. The standard lens furnished is 36mm focal length, f/3.5 in a graduated focusing mount. Other lenses are available up to 6 in. or 9 in. focal lengths on special models.

Two models of the Auto Camera Mark 3 are now available, the Mark 3 A, providing 200 pictures 1 in. x 1 in. and the Mark 3 B, 300 pictures ¾ in. x 1 in.

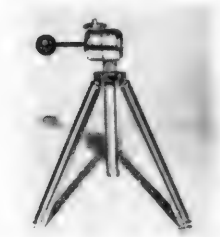
The camera measures 8⅞ in. long, x 3⅜ in. wide x 4 in. high and weighs under 6 pounds. It may be mounted from the front or base.



## NEW UNIVERSAL CATHODE-RAY OSCILLOSCOPE RECORDING CAMERA

*An unusual and versatile cathode-ray oscilloscope recording camera which provides for still, continuously moving film, and drum photography, is announced by J. A. Maurer, Inc., Photographic Instrumentation Division, 37-01 31st St., Long Island City 1, N.Y. These three modes of operation, each having its own special advantages, provide records for measurement of electrical and physical phenomena that may be displayed on a cathode-ray tube. This camera is manufactured by Southern Instruments Ltd., Surrey, England. A continuous feed mechanism provides for the movement of 25 ft. of sensitized material at rates of from 0.4 to 100 in. per second. The drum attachment, carrying 20 in. of sensitized material, provides linear speeds from 4 to 1[illegible] in. per second. Perforated or unperforated film or paper of either 35mm or 70mm width may be accommodated. The drive motor operates on 6 to 12 volts approximately, drawing 6 amperes maximum. An f/1.9 lens is furnished as standard. For further details write J. A. Maurer, Inc., attention Mr. Kenneth Shaftan.*

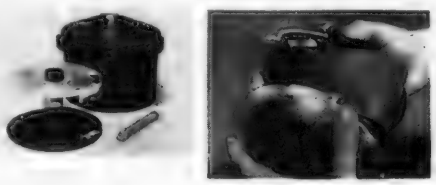
## PRESTON MIDGET PANHEAD



*Camera Specialty Company are exclusive distributors for the new Preston Midget Panhead imported from Europe. It measures 8 inches in length and is constructed of aluminum and steel. A turn of the handle will permit a horizontal panning of 360° — and a vertical tilt up to [illegible]°. List price $2.95.*

## NEW FILM DEVELOPING APPARATUS

*Ansco has just announced what they consider to be one of the most unusual darkroom devices to come along in some years. The device is a new film developing tank with a patented self-threading reel. It is said to speed the film loading operation down to a matter of seconds, even when used with highest speed films that demand total darkness. The new tank and reel are made of inert plastic. The top flange of the reel is transparent so that reversal color films may be given the second exposure without removing the film from the reel. The tank has a locking top with a built-in funnel and drainage outlets. The loading procedure appears to be extremely simple. After alignment of the reel flanges, the end of the film is inserted about two inches under spring-loaded polished stainless steel ball type ratchets. The flanges are then moved back and forth. The ball ratchets, by alternately gripping opposite edges of the film, push the roll into the reel. Available from dealers, complete with agitator spindle and a practice film strip, $4.95 list.*



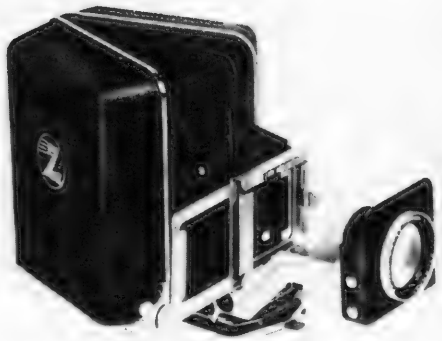
## MICRO-SLIDE FIELD FINDER

*The Lovins Engineering Co., 8203 Cedar St., Silver Spring, Md. have reported much success with their recently introduced Micro-Slide Field Finder in all areas of biology where the microscope is used. It consists of a precision rectangular-coordinate grid printed on a precisely dimensioned microscope slide 1 in. x 3 in. The grid covers more than half the area of the slide, so that fields of interest can be located on any part of a slide. The grid is graduated into intervals of 0.1mm, with each mm numbered or lettered, thus making it possible to locate a field with great accuracy. Full descriptive literature can be obtained from the manufacturer. List price, complete with case, $40.00.*

### *NEW F/0.75 LENS FOR CINEFLUOROGRAPHY*

*The Eastman Kodak Company has just announced the availability of a 75 mm focal length lens, f/0.75, especially designed for motion picture recording of fluorescent screen images. It has been specifically calculated for a flat field only. It is said to give excellent definition of a 12 in. diameter circle on a ¾ in. diameter image; good definition over a ¾ in. diameter image; acceptable definition out to a 1¼ in. diameter image. The latter corresponds to the corner of the ¾ in. x 1 in. standard silent 35mm movie frame. The new lens is achromatized for the central green region of the spectrum, thus is not suitable for ultraviolet applications.*

*The Kodak lens designers have achieved an unusually difficult task. The theoretical maximum aperture for a lens design, most optical designers agree, is about f/0.5. Even this is beyond the realm of practicality, since the marginal rays from such a lens would be bent almost vertically — and thus parallel the surface of the film instead of striking it directly. Even at f/0.6, marginal rays are bent at approximately 85°. The new f/0.75 lens is twice as fast as f/1.0, four times the speed of f/1.4, and eight times as fast as f/2. The price will be approximately $3000.00.*



### *ZETT PROJECTOR*

*Willoughbys, 110 W. 32nd St., New York 1, N.Y. are distributing the Zett projector. It measures 4¼ x 2¾ x 5 inches and weighs 1¾ lbs. They state it has adequate power for an audience of 100 and can be carried in a topcoat pocket. With a Voigtlander f/2.8 lens color corrected, it sells for $70.50.*

### *KODAK X-RAY MATERIALS*

*The Eastman Kodak Company has published a new 14 page catalog available to users of X-ray materials in medicine and dentistry.*

## EDITOR'S NOTE

**Members are requested and encouraged to mention the Journal of the Biological Photographic Association when writing to manufacturers or distributors for further information on any products described in these pages. Such action may have a marked bearing on the future policy of the Journal since the advisability of carrying paid advertising to help support and expand the Journal is now under consideration. Potential advertisers can best be made aware of the concentrated circulation of the Journal among active scientific photographers by telling them where you saw announcements of their products. We ask your wholehearted cooperation.**

**For describing new products in this section of the Journal the Editor depends upon data released from the manufacturer or supplier. The Biological Photographic Association assumes no responsibility for claims or implied guarantees.**

# Your Association

*A section of the Journal devoted to official announcements, chapter news, activities of members, and other such matters concerning the Association.*

## CHAPTER NEWS

*Warren Sturgis, Chapter Committee Chairman*

Your Chairman has considerable to report. We regret that space does not allow complete reports of every chapter meeting but, we can hit the high spots.

In this connection I should like to call the attention of all chapters to the present methods employed by New York, Northern Ohio, and Texas, all of whom distribute mimeographed reports of their previous meetings. New York has a comprehensive abstract of the paper prepared by a competent member; Northern Ohio publishes complete minutes, and Texas issues an interesting "Newsletter". These reports serve to keep chapter members (as well as the Chapter Committee Chairman!) abreast of all activities and actions taken at business meetings, and assist your Chairman in preparing these quarterly Journal reports.

*Boston:* On October 28 Bruno Mickeleit was host at the new Photo-Lab of the Veterans Administration Hospital where an inspection tour was conducted and Fred Harding discussed the 22nd Annual B.P.A. Meeting. The January Meeting of the Chapter was devoted to a "White Elephant Sale", an activity which has been growing popular as a yearly event with a number of chapters.

*Chicago:* Secretary Maria Ikenberg reports regular meetings on a wide variety of subjects, starting last September with a symposium on "Right and Wrong in Medical Photography", led by Inez Porter and W. H. Zieler. A Print Discussion was held in October, and Ralph Creer, top authority in his subject, spoke on "Latest Observations in the Field of Medical Photography and Medical Motion Pictures" before the November gathering. The Chapter's annual Christmas Dinner, always a successful occasion, followed a pre-dinner party at which President Zieler was host. The New Year started with Inez Porter's paper on "A Bright Future for the Medical Photographer", given on January 20.

*New York:* The first meeting of the year was, as usual, an informal "Get-Together and Beer Party" in September, where Chairman Gene Ostroff welcomed new members, gave a report on the Annual Meeting, and motion pictures were shown. Mr. E. Wilfred Taylor, of Cooke, Troughton & Simms, Ltd., in London, spoke on October 16 on "Microscopy and Photomicrography with the Ultra-Violet Microscope". Mr. Taylor has been visiting this country, and the availability of his services as a lecturer before various B.P.A. Chapters has been much appreciated by all who have heard him speak. The December meeting was devoted to "Principles and Technique of Dye Transfer Printing". Lloyd E. Varden, Journal Editor, discussed sensitometric characteristics of film materials, separation negatives, proper exposure and balance. A special feature of the evening was a demonstration of the actual procedure of dyeing, rinsing, and printing of a set of matrices by Peter Krause, assisted by Maud Kothe. In January, Julius Weber and Gershon Shapira described the latest methods for "Exposure Determination in Color and Black-and-White Photography in Medicine and Allied Sciences". All meetings have been held in the auditorium of the Cornell University Medical College which, for the fifth consecutive year, has kindly provided this space.

*Northern Ohio:* Brief note to finish up last year's report from this Chapter: a "basket picnic" was held on July 13, at which members and their families turned out in force. The September meeting was devoted to plans for attending the Annual Meeting in New York. In October Mr. Taylor from London and Mr. Osgood, of the R. Y. Ferner Co. were the speakers. (See note above, in news

of the New York Chapter.) The November meeting was held at the Warner and Swasey Observatory, where members were given a most interesting tour by Mr. William Brunk, who then spoke on techniques employed in taking photographs of stars. This should be a reminder to us all that there are many fields of scientific photography which, although not intimately connected with biology, have much of interest and value to offer B.P.A. members. The December meeting was devoted to a print and slide discussion.

*Rochester:* During last autumn two regular meetings were held, one concerned with "High Speed Photography in Medicine", addressed by John Waddell, Director of the Fastex Division of Wollensack Optical Co., the second on "Identification and Photography in Law Enforcement". For this latter the Rochester Police Department sent their Chief of Detectives, Mr. William A. Winfield, who gave a most interesting presentation of methods used by his department. January provided an opportunity for members to attend two meetings. In conjunction with the Rochester Section of the P.S.A. Technical Section a session was held on "The Use of Photographic Plates for Recording Nuclear Particles", under Julian H. Webb of Kodak Research Laboratories, as well as "Technical Aspects of Autoradiography", by Henry J. Gomberg, of the University of Michigan. This latter subject seems to be very popular today, for the following week Dr. George A. Boyd from the Oak Ridge Institute of Nuclear Studies likewise spoke before the Chapter on "Techniques of Autoradiography".

*Southern California:* Knowing that Los Angeles' city limits extend practically across the state, and that no location is within miles of another, we figure out from Avis Gregersen's lengthy announcements that Chapter members must wear out a lot of shoe-leather or bus tokens travelling to their meetings! Perhaps that is what (reputedly) makes their meetings constantly interesting, and keeps the members themselves (a known fact) always on the ball! For instance, in October at the County Museum Sy Wexler presented the latest Churchill-and-Wexler films, "Antibiotics and Terramycin" and "Wonders in a Country Stream". November saw the group at U.C.L.A., where another film "Surgical Anatomy of the Lumbo-renal Area" was shown and discussed by its producer, Ed Hamilton. To the accompaniment of coffee and refreshments (?) the December meeting was held at the Clark Hotel. "Photographing Insects in Arizona" was the subject of a Kodachrome-illustrated talk by Lloyd Martin and Athon Lewis. Just for good measure a "Chinese Auction" was thrown in, where exposure meters, tripods and lenses were sold to the highest bidders. (We've often thought that a Chinese exposure meter might be a little difficult to read; but then, our California members are a pretty versatile bunch.) An intensive study of Eye Photography is the description of the meeting held on January 15, where Mr. Mort Raymond discussed the Bausch & Lomb Fundus Camera and Mr. Z. Newhouse his work with the Zeiss-Nordensen Camera.

*Texas:* Because of the wide geographical distribution of the members of this Chapter (just another way of saying that we realize Texas is a *big* state) announced meetings are held only at intervals of several months. But when they do get together a great deal goes on! Late last summer occurred a meeting at the home of Mr. and Mrs. Boaz in Dallas which we have not reported up to now. Dr. Brussells, Chief of Professional Service of the V. A. Hospital, spoke of the U.S. Medical Field Service's recent use "of the ultimate in visual education, where slides, filmstrips, graphs, charts, and motion pictures are used to bring the latest advances in their training program". Mr. Irwin Gans of the Southwest Film Laboratory, Inc. discussed the operation of a laboratory, and gave a practical demonstration of film production. A regular meeting was held in Temple in November at the V. A. Hospital there. It occupied the greater part of a day, and the famed Scott-White Memorial Hospital entertained the group with a buffet dinner at the Kyle Hotel afterwards. A notice has just been received of the February meeting at the Shell Oil Co. in Houston, but details are unavailable as we go to press. A special word of commendation should be given this, one of our newest chapters, for their attractively printed Chapter Information and Membership Application Blank.

*Upper Midwest:* This Chapter, also one of our newest and most widely distributed, holds only quarterly meetings, but makes up for it by stretching them over two whole days.

Jim Rothenberger presided in September at the School of Dentistry of the University of Minnesota. The program is too long to give in detail, but the list of subjects covered — sound films of blood circulation, dye transfer techniques, autoradiography in dentistry, operation of a large research photographic laboratory, tour of a television studio — attest to the vitality of this growing Chapter. A Business Meeting and Banquet concluded the functions. The subjects of the February meeting at the State University of Iowa in Iowa City were no less varied: Flexichrome in Medical Illustration, Eye Photography, Science of Color, sound motion pictures on epilepsy. We might say, in passing, that this Chapter is certainly offering convincing evidence that their bid for an Annual B.P.A. Meeting in the future should be taken seriously!

*West Virginia:* Inasmuch as this Chapter has temporarily lost Dick Crawford, one of its main organizers, to the Army, President Turner and Mr. Dickenson are to be congratulated on continuing their interesting yearly program of meetings with the West Virginia Academy of Sciences. Through some error in the mails, the report of last year's meeting, held in May, was only received recently. Intermixed between luncheons, dinners, and the regular meeting of the Academy, the following B.P.A. presentations were given: "Photography in the Oak Wilt Battle" (R. G. Dickenson, Jr.), "Use of Photomicrographic Equipment" (W. R. Tenney), "Calibration of a Densichron" (J. J. Eichenmuller), "Color Photography of Wild Flowers" (J. F. Clovis), "Slide Binding and Mounting" (R. G. Dickenson, Jr.), plus several motion pictures.

## CHAPTER SECRETARIES

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Laurence B. Brown
Harvard School of Dental Medicine
188 Longwood Ave.
Boston 15, Mass.

*Chicago Chapter*
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University of Illinois
College of Medicine
1853 W. Polk St.
Chicago 12, Ill.

*New York Chapter*
Miss Barbara Turkington
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1300 York Ave.
New York 21, N.Y.

*Northern Ohio Chapter*
Rolla B. McCashen
Pathology Lab
City Hospital
Cleveland, Ohio

*Philadelphia Chapter*
Albert R. Latven
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Havertown, Pa.

*Rochester Chapter*
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*Texas Chapter*
Mrs. Ella May Breckenridge
V. A. Hospital
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Houston 34, Tex.

*Upper Midwest Chapter*
Lardner A. Coffey
Photographic Dept.
Mayo Clinic
Rochester, Minn.

*West Virginia Chapter*
Mrs. Wilton Tenney
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Morgantown, W. Va.

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Dept. of Medical Photography
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Rochester 8, N.Y.

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**DAVID LUBIN, FBPA, '55**
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**CHESTER F. REATHER, '55**
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Photographic Dept.
Baltimore 5, Md.

**GEORGE L. ROYER, Ph. D., FBPA, '54**
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American Cyanamid Co.
Bound Brook, N.J.

**STELLA ZIMMER, FBPA, '54**
State University of New York
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Syracuse University
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Syracuse 10, N.Y.

**(President 1949-51)**
**OSCAR W. RICHARDS, Ph. D., FBPA**
American Optical Company
Stamford, Conn.

**(President 1947-49)**
**EDMOND J. FARRIS, Ph. D., FBPA**
The Wistar Institute
Philadelphia 4, Pa.

**(President 1945-47)**
**STANLEY J. McCOMB, FBPA**
Section of Photography
Mayo Clinic
Rochester, Minn.

### APOLOGY TO THE HITCHCOCK FOUNDATION

The cover of our November 1952 Journal (Vol. 20, No. 4) carried a picture of an exhibit entitled Medical Illustration A Modern Service to Medicine without giving due credit to the Hitchcock Foundation and especially Mr. John Withee of the Foundation staff, who prepared the exhibit. The Biological Photoghaphic Association is deeply indebted to the Hitchcock Foundation for sponsoring the preparation of the exhibit and we sincerely regret the oversight in not giving them credit. The exhibit has been shown at various national meetings under the sponsorship of BPA and it appears that we failed to credit the Hitchcock Foundation or Mr. Withee on these occasions also. We do appreciate the splendid cooperation of the Foundation and every effort will be made in the future to give proper acknowledgment to them.

### MEMBERS INVITED TO SUBMIT PAPERS

David S. Ruhe, M.D., Director of the Association of American Medical Colleges, has extended an invitation to BPA members to submit material for publication in The Journal of Medical Education, 185 N. Wabash Ave., Chicago 1, Ill. Dr. Ruhe states that their journal, in conjunction with the Medical Audio-Visual Institute, is seeking to expand their journal section entitled Audio-Visual News. Material submitted should be of general interest to medical faculty members and to others actively engaged in medical teaching. It should be concerned with practical considerations of classrooms utilization, as well as with fundamentals of audio-visual teaching idealogy. The Journal of Medical Education has no intention of competing with our own Journal in publishing papers of a technical character on clinical photography and medical illustration.

### BPA WRITE-UP

Members will be interested in reading the excellent report on our Association and its activities by Victor H. Scales in the February 1953 issue of American Photography, pages 62-63.

## CHAIRMEN OF STANDING COMMITTEES

*Admissions Committee*
Miss Anne Shiras
Photographic Dept.
Magee Hospital
Pittsburgh, Pa.

*Award Committee*
Ralph P. Creer
American Medical Association
535 North Dearborn St.
Chicago, Ill.

*Chapters Committee*
Warren Sturgis
Sturgis-Grant Productions
314 East 46th St.
New York, N.Y.

*Certification Committee*
Louis Paul Flory
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Chevy Chase, Md.

*Educational Committee*
John J. Beiter
Rochester General Hospital
Dept. of Medical Photography
Pathology Laboratories
Rochester, N.Y.

*Fellowship Committee*
Dr. George L. Royer
Calco Chemical Division
American Cyanamid Co.
Bound Brook, N.J.

*Financial Committee*
Dr. Edmond J. Farris
The Wistar Institute
Philadelphia, Pa.

*Historical Committee*
Miss Stella Zimmer
State University of New York
Medical Center
Syracuse University
766 Irving Avenue
Syracuse, N.Y.

*Journal Paper Committee*
Mrs. Ella May Breckenridge
V. A. Hospital
2002 Holcombe Blvd.
Houston 4, Tex.

*Membership Committee*
Harris B. Tuttle
343 State Street
Rochester, N.Y.

*Motion Picture Committee*
Dr. Ralph Buchsbaum
4357 Schenley Farms Terrace
Pittsburgh, Pa.

*Nominating Committee*
Leonard Julin
Dept. of Photography
Mayo Clinic
Rochester, Minn.

*Publicity Committee*
Lloyd E. Varden
Pavelle Color Incorporated
533 West 57th St.
New York, N.Y.

*Salon Committee*
H. Lou Gibson
343 State St.
Rochester, N.Y.

## MEMBERS INVITED TO SUBMIT PHOTOGRAPHS

Prof. Raymond F. Piper, Ph.D., Department of Philosophy, Syracuse University, Syracuse 10, N.Y., is preparing a new book to be entitled Cosmic Art. One chapter is to be concerned with geometric patterns in nature and he is particularly seeking photographs of natural geometric forms, e.g., snowflakes and crystals. Material for consideration should be sent directly to Prof. Piper.

## 23rd ANNUAL MEETING

Plan now to attend the 23rd Annual Meeting of the Association to be held in Los Angeles from August 31 to September 3 at the Statler Hotel. Mr. William L. Martinsen, 2901 Washington Ave., Santa Monica, Calif., is the General Chairman. Mr. Martinsen, and other members of the Southern California Chapter, are arranging a top-notch meeting.

## EDUCATION COMMITTEE SEEKS INFORMATION

The Education Committee, recently created by the Board of Directors with instructions to function in close cooperation with the Certification Committee, has been directed to:

1) Assay the educational and training needs of biological photographers
2) Determine what educational and training opportunities are available in the field of biological photography
3) Appraise such opportunities in terms of existing needs
4) Recommend standards of education and training in support of the certification program

The Committee needs your assistance in fulfilling its obligations to the Association, particularly in its efforts to determine the extent of education and training available to biological photographers. If you are providing such training, or have any knowledge of training in biological photography offered elsewhere, please communicate with the Committee through any of its members. In addition, your ideas and opinions concerning any of the Committee's activities will be welcomed.

The work of the Education Committee is basic to decisions yet to be made in the certification program. Help to insure the firmness of the future structure of biological photography by contributing your information today.

Write to:

John J. Beiter, *Chairman*
Education Committee
Rochester General Hospital
Rochester 8, New York

Thomas Jones
Illustration Studio
1853 West Polk Street
Colleges of Medicine,
Dentistry and Pharmacy
Chicago 12, Illinois

Percy W. Brooks
Department of Photography
Cornell University
Medical College
1300 York Avenue
New York 21, New York

## INTERNATIONAL CONFERENCE ON THE SCIENCE AND APPLICATIONS OF PHOTOGRAPHY

The Royal Photographic Society of Great Britain celebrates its Centenary in 1953 and will hold an International Conference on the Science and Applications of Photography in London from Saturday, September 19, 1953 to Friday, September 25, 1953. The Conference will cover many aspects of the science, technique and applications of photography and will be divided into sections dealing with:

1.) Photographic Science (including theory of latent image and development, sensitization, sensitometry, resolving power, granularity, properties of photographic materials).
2.) Cinematography and Colour Photography.
3.) Technique and Applications of Photography (including industrial readiography, photomicrography, spectroscopy, aerial photography, photogrammetry, high-speed photography, nuclear track recording, and other physical, chemical and biological applications; photocopying; apparatus, processes, manipulations).
4.) Photomechanical Processes.
5.) History, Literature (including abstracting and documentation) and Training in Photography.

All persons taking an interest in photography or its applications are cordially invited to attend the Conference. Further details will be sent on application to the Hon. Secretary, R.P.S. Centenary Conference, 16 Princes Gate, London, S.W. 7.

## BRITISH CONFERENCE ON MEDICAL PHOTOGRAPHY

A Conference on Medical Photography was arranged by the Medical Group of the Institute of British Photographers, October 10-12 at the Royal Hotel, London. Papers included: The Place of Photography in Medical Research, by Spencer Breslin; The Johnson Color Screen Process, by T. C. Dodds; Clinical Aspects of Medical Photography, by Dr. Robert Ollerenshaw; a symposium on The Future Tasks of Medical Photography by Dr. Peter Hansell.

## ACTIVITIES OF MEMBERS

Dr. George Royer has been appointed to the eight-man Editorial Advisory Board for the American Chemical Society "Advances In Chemistry Series". His picture appeared in Chemical and Engineering News, Dec. 15, 1952.

Jean Dragesco (France) has a paper on toxic trichocysts in the Bul. Micr. Appl. (Paris).

Dr. Oscar W. Richards gave a paper on "Phase Microscopy" at a meeting of the New York State Association of Public Health Laboratories, an abstract of which appeared in their *Proceedings*, Vol. XXXII, No. 1 (1952). Dr. Richards more recently gave three papers on problems of vision during the "Symposium on Motorists' Vision" at Iowa State College, followed by two papers on "phase" at Colorado College.

Lt. Stephen P. Dittman, MSC, has just advised that he is now the Medical Photographic Officer with the Medical Research Team operating in the Far East.

H. G. Kobrak, M.D., was awarded the Silver Cup at the International Film Festival for Medical-Scientific Films, Turin, Italy, 1952.

Robert D. Neubecker, M.D., published a paper entitled A Simplified Technique for Taking 35mm Color Photomicrographs in the U.S. Armed Forces Medical Journal, Volume III, No. 7, July 1952.

Philip A. Conrath has been raised from Assistant Professor of Medical Illustration to Associate Professor at the St. Louis University School of Medicine. Prof. Conrath has also been elected Chairman of the Board of Governors of the Association of Medical Illustrators through 1953.

Miss Alexis A. Alvey recently returned from a Sabbatical leave, during which she toured Great Britain and other countries, journeying back through the Panama Canal. She reports that much of her time was devoted to taking color photographs.

Frederick W. Lloyd has been recently appointed as assistant to Ralph P. Creer, Secretary of the Committee on Medical Motion Pictures, American Medical Association. Mr. Lloyd received his training in audio-visual education at the University of Iowa, Iowa City, Iowa.

## WITHEE WINS AWARD

Mr. John E. Withee, Director, Department of Medical Illustration, Hitchcock Foundation, Hanover, N.H. won the first award in the class for original work at the December, 1952 meeting of the American Academy of Dermatology held in Chicago. The exhibit, designed and prepared by Mr. Withee, consisted of a group of 8 in. x 10 in. color photomicrographs of sweat glands. Congratulations to Mr. Withee for this well-deserved honor.

Photograph of Withee Exhibit

## RALPH CREER VISITS MEXICO

Mr. Ralph Creer was invited to serve as Honorary President of the Section of Audio-Visual Teaching at the Tenth National Assembly of Surgeons, held at the Jaurez Hospital, Mexico City, November 9-15, 1952. He presented a paper on "The Value of Motion Pictures in Medical Teaching." At the invitation of the local office of the Institute of Inter-American affairs, Mr. Creer visited the Faculty of Medicine in Veracruz and discussed with the dean and members of his staff the general subject of motion pictures as applied to medical teaching. The medical schools in Mexico, according to Mr. Creer, are most anxious to obtain good basic-type teaching films from the United States.

## NEW B.P.A. MEMBERS

*(Sept. 1952 through Dec. 1952)*

D. C. Anderson, *Sault Ste. Marie, Ont., Canada*
Andrew Andreeko, *Plains, Pennsylvania*
Dr. John R. Arnold, *Los Angeles, California*
Charles M. Bailey, *Rochester, New York*
H. R. Bancks, M.D., *Brooklyn, New York*
Ivan Barcellos, *Rio de Janeiro, Brazil, S.A.*
Oscar J. Becker, M.D., *Chicago 2, Illinois*
William T. Besser, *Asheville, North Carolina*
Curtis L. Bowman, *Waynesboro, Virginia*
Robert R. Brazy, M.D., *Milwaukee, Wisconsin*
Charles J. Brodman, M.D., *East Orange, New Jersey*
Billy D. Burk, *Dallas, Texas*
Maurice O. Button, *Ottawa, Canada*
William Henry Carter, Jr., *Houston, Texas*
Virgil Cheek, *Fort Lee, New Jersey*
Maynard Cheney, *Framingham, Mass.*
Frances Chubb, *Lawrence, Kansas*
Richard L. Clark, *Columbia, Missouri*
Morrie Cohen, *Philadelphia, Pennsylvania*
Raymond Cole, *Orillio, Ont., Canada*
Alfred S. Conston, M.D., *Philadelphia, Pennsylvania*
H. L. Correll, *Milwaukee, Wisconsin*
Ella Louise Craig, *New York, New York*
Elise B. Cunningham, *Boston, Massachusetts*
Harriet B. Danforth, *Minneapolis, Minnesota*
William Danz, *North Bergen, New Jersey*
Sgt. George W. Derickson, *Camp Lejeune, North Carolina*
Arthur Gerard De Voe, M.D., *Pelham Manor, New York*
Alvin C. Drummond, M.D., *New York, New York*
Charles H. Elliott, *New Brunswick, New Jersey*
Paul G. Ellis, *Bethesda, Maryland*
Naydne Anne Foss, *Boston, Massachusetts*
Clifford L. Freehe, *Seattle, Washington*
John P. Goeller, *Long Island City, New York*
Warren H. Green, *Springfield, Illinois*
Roy Haeg, *Minneapolis, Minnesota*
Wesley E. Halbritter, *Sioux Falls, South Dakota*
Allan A. Hammer, *Franklin, New Hampshire*
Jake Harshbarger, *Ponape, Caroline Islands*
Eugene Heydemann, *Baltimore, Maryland*
Dean John S. Hirschboeck, *Milwaukee, Wisconsin*
William M. Holmes, *Minneapolis, Minnesota*
Marjorie E. Jacobson, *Fairport, New York*
Dr. William Jenkins, *Englewood, New Jersey*
Donald E. Kearns, *West Hill, Ont., Canada*
Robert E. Kent, *Little Falls, New Jersey*
Douglass S. King, M.D., *Alliance, Ohio*
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# MEDICAL and BIOLOGICAL ILLUSTRATION

Volume II — No. 4 October 1952

## CONTENTS

Insect Photography from Life, S. Beaufoy

Leonardo Da Vinci and Anatomical Demonstration, K. D. Keele

Ross Board Technique, Dorothy Davison

Photography in Plastic Surgery, Nils L. Eckhoff

Technical Considerations in Photomacrography, H. Lou Gibson

A Technique for Demonstrating the Arnold-Chiari Malformation, Derek Martin

Exhibitions

Equipment and Methods

- Shading with Neo-coccine
- The Reactivation of Dry Cells
- Ilford Open Flash Holder
- A Technique of Water Colour Painting
- The AWC Proportioner
- 16mm Processing Equipment
- Studio Shutters

Abstracts

Book Reviews

Motion Pictures

Reports from Societies

Index to Vol. II

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# CONTENTS

JOURNAL OF THE BIOLOGICAL PHOTOGRAPHIC ASSOCIATION
Volume 21, Number 1 — February, 1953

THE PHOTOGRAPHY OF GROSS SPECIMENS . . . . . Ella May Shackelford Breckenridge and Béla Halpert 1

PHOTOGRAPHY IN A FOOD RESEARCH LABORATORY . . . . . G. A. Werner and W. D. Roth 5

MICROFILMING OF RADIOGRAPHS . . . . . Robert T. Morrison 11

X-RAY COPYING WITHOUT GUESSWORK . . . Earl C. Bartlett 15

SPEEDLIGHTS IN MEDICAL PHOTOGRAPHY . . Harry L. Parker 17

PHOTOGRAPHIC STANDARDS IN MEDICAL EDUCATION . . . . . John K. Lattimer 21

FACTORS WHICH IMPROVE CLINICAL MOTION PICTURES . . . . . Ervin W. Miller 25

METHOD FOR MARKING LANTERN SLIDES . . . . . Ella May Shackelford Breckenridge 29

NOTES ON RETOUCHING COLOR PRINTS . . . . . Maude Belling Varden 29

THE SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS . Herbert Barnett 30

BOOK REVIEWS . . . . . All reviews by the Editor — Lloyd E. Varden 31

NEW PRODUCTS . . . . . 34

YOUR ASSOCIATION . . . . . 39

NEW B.P.A. MEMBERS (Sept. 1952 through Dec. 1952) . . . . 46

CONTENTS OF MEDICAL AND BIOLOGICAL ILLUSTRATION . . . . 47

CONTRIBUTING MEMBERS . . . . . 48

SUSTAINING MEMBERS, FELLOWS OF THE ASSOCIATION, FELLOWSHIP PROCEDURE . . . . . Inside Back Cover

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